MDP-A3000

SERVICE MANUAL

E Model

SONY
C-QUICK REVERSE
LaserDisc

Differences Manual

- MDP-A3000 are based on model MDP-MR1 E model.

[Main difference]
1. The part numbers of exploded views are changed.
2. Service parts of accessories and packing materials are changed.

In this service manual, Only the difference from E model are mentioned. When servicing, see the MDP-MR1 service manual (9-973-634-11) and supplement-1 (9-973-634-81) with this.

CD CDV LD PLAYER

SONY®

5-1-1. CASE AND FRONT PANEL ASSEMBLY (Page. 5-1)

MDP-MR1 (E)			MDP-A3000 (E)		
Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	X-3944-515-1	DOOR (90E) ASSY (EXCEPT TW)	1	X-3945-043-1	DOOR (90A) ASSY
4	X-3944-516-1	PANEL (90E) ASSY, FRONT (EXCEPT TW)	4	X-3945-042-1	PANEL (90A) ASSY, FRONT
5	3-961-068-11	SEAL, FOOT	5	3-961-068-21	SEAL, FOOT
21	A-6772-990-A	REMOTE CONTROL COMPLETE ASSY (EXCEPT TW)		------------	(No corresponded parts)
* 22	3-959-554-01	COVER (ATW), BATTERY		------------	(No corresponded parts)

5-1-2. CHUCKING BLOCK ASSEMBLY (Page. 5-2)

MDP-MR1 (E)			MDP-A3000 (E)		
Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
* 66	3-961-079-01	PANEL, REAR (EXCEPT TW)	* 66	3-961-079-31	PANEL, REAR

ACCESSORIES & PACKING MATERIALS

MDP-MR1 (E)			MDP-A3000 (E)		
Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
	1-569-008-11	ADAPTER, CONVERSION 2P (EXCEPT TW, HK)		------------	(No corresponded parts)
	1-575-334-11	CORD, CONNECTION (A/V connecting cable (STEREO), 1.5m)		------------	(No corresponded parts)
	3-798-585-11	MANUAL, INSTRUCTION (ENGLISH, SPANISH, CHINESE) (EXCEPT TW)		------------	(No corresponded parts)
	A-6772-990-A	REMOTE CONTROL (RMT-M23A) (EXCEPT TW)		------------	(No corresponded parts)
*	X-3944-710-1	INDIVIDUAL CARTON ASSY (EXCEPT TW, HK)	*	3-963-767-01	INDIVIDUAL CARTON

English
95C09098-1
Printed in Japan
© 1995. 3
Published by Personal A&V Products Div.
Quality Engineering Dept.

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

9-973-730-11

MDP-MR1
RMT-M23A

SERVICE MANUAL

E Model
Chinese Model
Hong kong Model
Taiwan Model
ME Model

We will inform of the printed wiring boad, schematic diagram and repair parts list of power supply block in the future.

SPECIFICATIONS

System

Type
CD/CDV/LD player

Signal readout
Optical (Laser beam reflection)

Signal format system
EIA standard, NTSC colour system

Playing time
See "Optical discs" on page 1-7.

Digital audio specifications

Frequency response
4 Hz to 20 kHz (±1.0 dB)

Signal-to-noise ratio
More than 115 dB (EIAJ)*

Dynamic range
More than 99 dB (EIAJ)

Wow and flutter
Below measurement limit (+0.001 % W.PEAK)(EIAJ)

Video specification

Horizontal video resolution
425 lines

Signal-to-noise ratio
More than 50 dB

* Measured according to EIAJ (Electric Industries Association of Japan) standards.

Input and Output

LINE OUT 1,2
VIDEO output, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced
AUDIO output, Phono jacks (2)
Stereo L, R
Analog: 200 mVrms
(1 kHz, 40 % modulation)
Digital: 200 mVrms
(1 kHz, –20 dB)

General

Power requirements
110–127/220–240 V AC, adjustable, 50/60 Hz

Power consumption
40 W

Operating temperature
5°C to 35°C

Ambient humidity
5% to 90 %

Dimensions
Approx. 355 × 116 × 421.5 mm (w/h/d)
including projecting parts and controls

Mass
Approx. 6.5 kg

Supplied accessories

Remote Commander RMT-M23A (1)
R6 (size AA) batteries (2)
Audio/Video Cable
(phono plug 3 ⟷ phono plug 3)(1)
AC plug adaptor (1)

Design and specifications are subject to change without notice.

CD CDV LD PLAYER

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.
6. Flexible Circuit board Repairing
    - Keep the temperature of the soldering iron around 270°C during repairing.
    - Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
    - Be careful not to apply force on the conductor when soldering or unsoldering.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

This CD CDV LD Player is classified as a CLASS 1 LASER product.

CAUTION

The use of optical instruments with the product will increase eye hazard.

As the laser beam used in this player is harmful to the eyes, do not attempt to disassemble the cabinet. Refer servicing to qualified personnel only.

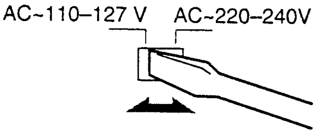
- If the unit is brought directly from a cold to a warm location, moisture may condense inside the player. If this happens, playback may not start. When you first install the unit, or when you move it from a cold to a warm location, wait for about one hour before operating the unit.

Operating voltage

- Before operating the player, make sure that the operating voltage of your unit is identical with that of your local power supply. If necessary, set the selector at the rear of the player to the voltage corresponding to your local power supply. The voltage selector of this unit is set to 220–240 V AC originally.

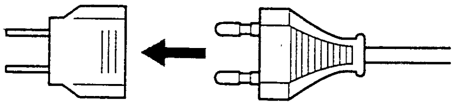
For	Set to
110, 120, or 127 volts AC	110–127 V
220 or 240 volts AC	220–240 V

- To set the voltage selector, disconnect the mains lead and set the selector to the appropriate position with a blade screwdriver.



Using the AC power plug adaptor

- If the AC plug on your unit does not fit into the wall outlet, attach the supplied AC plug adaptor.



If you have any questions or problems concerning your unit, please contact your nearest Sony dealer.

TABLE OF CONTENTS

Section Title Page

1. GENERAL

Unpacking ········· 1-1
Inserting batteries into the remote commander ········· 1-1
Connecting the player ········· 1-1
Playing a disc ········· 1-2
Resuming LD playback (Auto Resume) ········· 1-3
Understanding on-screen indications ········· 1-4
Searching for a particular point on the disc ········· 1-4
Specifying a chapter or track directly (Chapter/Track Search) ········· 1-5
Playing repeatedly (Repeat Play) ········· 1-5
Searching by frame number or time (Frame/Time Search) ········· 1-6
Viewing frame-by-frame action ········· 1-6
Using the sound control functions ········· 1-7
Optical discs ········· 1-7
Index to parts and controls ········· 1-8

2. DISASSEMBLY

2-1. Removal of Front Panel Assembly ········· 2-1
2-2. Opening of MB-717 Board (Service Position) ········· 2-1
2-3. Removal of Chucking Block and Tray Assembly ········· 2-2
2-4. Mounting the Chucking Block and Tray Assembly ········· 2-2
2-5. Height Adjustment of the Turn Table Assembly ········· 2-3
2-6. Removal of Feed Base Block Assembly ········· 2-3
2-7. Mounting the Feed Base Block Assembly ········· 2-4
2-8. Removal of Optical Device (KHS-150A (S)) (1) ········· 2-5
2-9. Removal of Optical Device (KHS-150A (S)) (2) ········· 2-6
2-10. Removal of Control Gear ········· 2-7
2-11. Removal of Idler Gear ········· 2-7
2-12. Internal Views ········· 2-8
2-13. Circuit Boards Location ········· 2-9

3. BLOCK DIAGRAMS

3-1. Overall Block Diagram ········· 3-1
3-2. Video Block Diagram ········· 3-4
3-3. Servo Block Diagram ········· 3-7
3-4. System Control Block Diagram ········· 3-10
3-5. Mode Control Block Diagram ········· 3-13
3-6. Audio Block Diagram ········· 3-15
3-7. Power Supply Block Diagram ········· 3-17

Section Title Page

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. Frame Schematic Diagram ········· 4-1
4-2. Printed Wiring Boards and Schematic Diagrams ········· 4-3

- MB-717 (Video, Servo, System Control, Audio) Board ········· 4-6
- MB-717 (Video) Board ········· 4-12
- MB-717 (Servo) Board ········· 4-15
- MT-707, SW-732 Boards ········· 4-18
- MB-717 (System Control), MT-707, SW-732 Boards ········· 4-19
- MB-717 (Audio) Board ········· 4-23
- BI-703, MD-705, FG-707, MT-706 Boards ········· 4-27
- FP-740, PW-717 Boards ········· 4-32

5. REPAIR PARTS LIST

5-1. Exploded Views ········· 5-1
  5-1-1. Case and Front Panel Assembly ········· 5-1
  5-1-2. Chucking Block Assembly ········· 5-2
  5-1-3. Main Chassis Assembly ········· 5-3
  5-1-4. Mechanism Deck Assembly ········· 5-4
5-2. Electrical Parts List ········· 5-5

6. IC PIN DESCRIPTION

6-1. Terminal Function of System Control Microcomputer (IC501: MB89094 on the MB-717 Board) ········· 6-1
6-2. Terminal Function of System Control IC (IC502: MBCG24692-4425 on the MB-717 Board) ········· 6-2
6-3. Terminal Function of Mode Control Microcomputer (IC102: MB89094 on the FP-740 Board) ········· 6-4

Section Title Page

7. ADJUSTMENTS

7-1. List of Servicing Jigs ······ 7-1
7-2. Cautions on Adjustment ······ 7-1
7-3. Operation of the MDP-MR1 with hidden Key Functions ······ 7-1
  1. Explanation of the hidden key functions ······ 7-1
  2. How to use "simultaneous main-unit-key-press functions" ······ 7-1
  3. How to use "simultaneous main-and-remote-control-units-key-press functions" ······ 7-2
7-4. Operation of the MDP-MR1 in the Service Mode ······ 7-2
  1. Explanation of the service mode ······ 7-2
  2. Entering the service mode ······ 7-2
  3. Quitting the service mode ······ 7-2
  4. Operating with the special key functions ······ 7-2
7-5. Operation of the MDP-MR1 in the Debugging Mode ··· 7-3
  1. Explanation of the debugging mode ······ 7-3
  2. Entering the debugging mode ······ 7-3
  3. Quitting the debugging mode ······ 7-4
  4. Changing the display on the screen ······ 7-4
  5. Explanation of the debugging display ······ 7-4
7-6. Power Supply Adjustment ······ 7-10
  7-6-1. EVER 5V Adjustment (Power Supply Block) ······ 7-10
  7-6-2. REG +5V Adjustment (Power Supply Block) ······ 7-10
  7-6-3. Power Supply Check (Power Supply Block) ······ 7-11
7-7. System Control System Adjustment ······ 7-11
  7-7-1. Microprocessor Clock Adjustment (MB-717 Board) ······ 7-11
7-8. Servo System Adjustment ······ 7-12
  7-8-1. LD Side A Tilt Balance Adjustment ······ 7-12
  7-8-2. LD Side B Tilt Balance Adjustment ······ 7-13
7-9. Video System Adjustment ······ 7-14
  7-9-1. Video Output Level Adjustment (MB-717 Board) ······ 7-14
7-10. Adjustment after the Attachment of the Optical pick-up Block ······ 7-14
  7-10-1. Jigs and Tools ······ 7-14
  7-10-2. CD Adjustment ······ 7-15
7-11. Parts Arrangement Diagram for Adjustment ······ 7-18

SUPPLEMENT-1

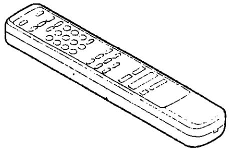
SECTION 1
GENERAL

This section is extracted from instruction manual.

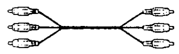
Step 1 Unpacking

Check that you have the following items:

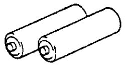
- **Remote commander**



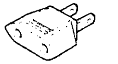
- **Audio/Video cable**



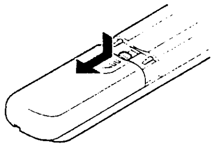
- **Two R6 (size AA) batteries**



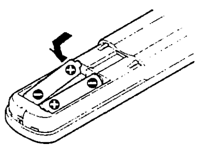
- **AC plug adaptor**



Step 2 Inserting batteries into the remote commander



1 **Turn the commander over, and remove the cover.**



2 **Check the polarities and position two R6 (size AA) batteries correctly.**

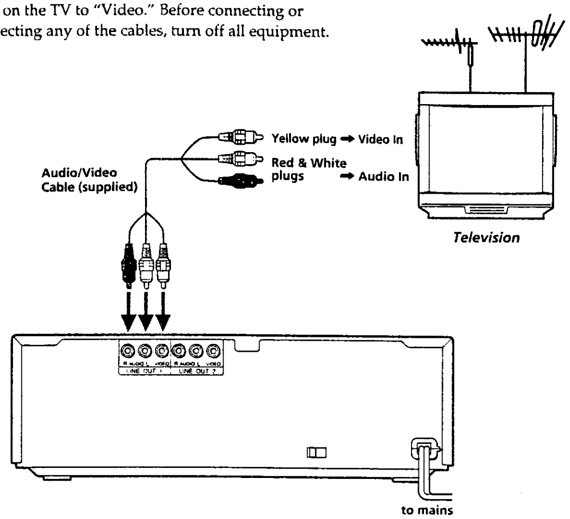
3 **Close the cover.**

Notes
- With normal use, the batteries should last for approximately six months.
- If you are not going to use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery together with an old one.
- Do not use different types of batteries together.

Step 3 Connecting the player

Television hook-up

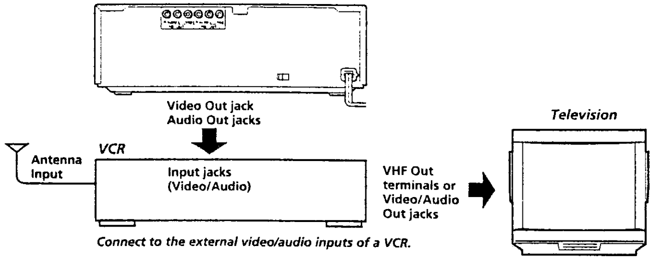
To play LDs or CDVs, hook up a television to the LD Player. Take out the supplied audio/video cable (yellow, red and white plugs). Use this to connect the player to the television. Once you have hooked-up the television, set the input selector on the TV to "Video." Before connecting or disconnecting any of the cables, turn off all equipment.


Yellow plug → Video In
Red & White plugs → Audio In
Audio/Video Cable (supplied)
Television
to mains

Notes
- Make sure all equipment is turned off before connecting or disconnecting any cables.
- Connection methods may differ; when in doubt about a connection, consult the TV or VCR manufacturer's manual.
- If the sound or picture is disturbed by noise, try moving the equipment farther apart.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- To prevent interference with TV broadcast reception, turn off all equipment connected but not currently in use.
- If the TV only has a monaural phono jack for audio input, use a VMC-910/915 Connecting Cable (not supplied).

Television/VCR hook-up

Connect the LD player to the VCR's inputs when:
- the video inputs of the TV are already used for the VCR or a similar machine.
- the TV has only an aerial input.

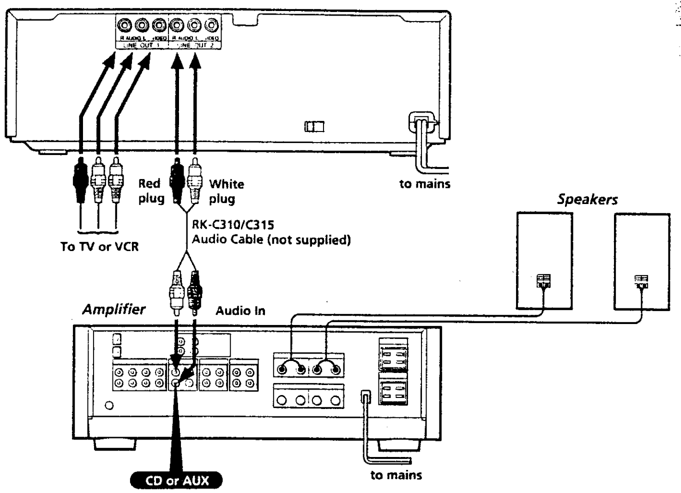

Video Out jack
Audio Out jacks
Antenna Input
VCR
Input jacks (Video/Audio)
VHF Out terminals or Video/Audio Out jacks
Television

Connect to the external video/audio inputs of a VCR.

Audio equipment hook-up

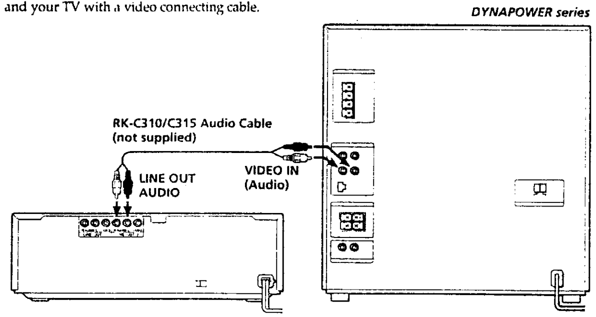
To achieve full stereo sound from your LD Player, hook up a stereo system following the diagram below. Use an RK-C310 (or RK-C315) audio connecting cable (not supplied) to connect the LD Player to your amplifier or receiver. Before connecting or disconnecting any of the below cables, turn off all equipment.

Notes
- Make sure all equipment is turned off before making any of the above connections.
- Firmly insert plugs into the jacks. A loose connection may cause noise.
- When listening to a radio broadcast, turn off the LD Player to get better reception.



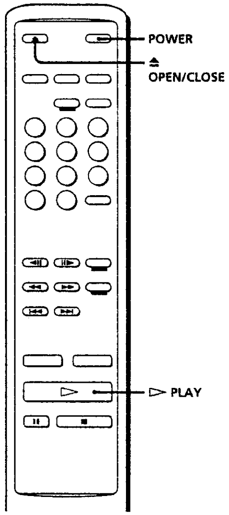
If you hook up the Sony Compact Hi-Fi Stereo System "DYNAPOWER" series

To enjoy stereo sound from the LD player with the Sony Compact Hi-Fi Stereo System, hook up the player and the DYNAPOWER with an RK-C310 (or RK-C315) audio connecting cable (not supplied). You must also hook up the player and your TV with a video connecting cable.



Basic Operations

Playing a disc



Tip
- You can also turn on the player by pressing ≜ OPEN/CLOSE on the player.

Notes
- If you place more than one disc on the disc tray, or if the disc is not seated properly, the disc may not start playing, and may damage the disc or player.
- Do not transport the player while playing a disc as doing so may damage your disc or player.
- Do not use a CD stabilizer when playing a CD as doing so may damage your disc or player.
- When you press ❚❚ PAUSE, the picture goes blank if you are playing a CLV LD or CDV, and the picture freezes if you are playing a CAV LD (see "Viewing frame-by-frame action" on page **16**).

This section shows you how to play an LD, CD or CDV.

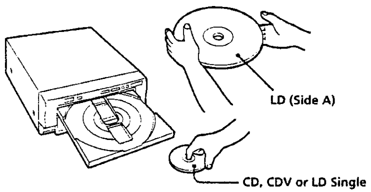
Before you start...
Connect the player to your TV and set the input selector on the TV to "Video" (see "Connecting the player" on page **6**).

Loading and playing a disc

1 **Press POWER to turn on the player.**
You can also directly turn on the player by pressing ▷ PLAY.

2 **Press ≜ OPEN/CLOSE to open the disc tray.**
The front cover of the player automatically slides down and the disc tray comes out.

3 **Place a disc on the disc tray.**



Place only one disc on the tray, carefully fitting it in the circle on the tray.

4 **Press ▷ PLAY.**
The disc tray closes and the upper side of the disc starts playing. You can also start playing by pressing the disc tray to close it.
When playback of the upper side of an LD (side A) ends, the other side (side B) starts playing automatically.

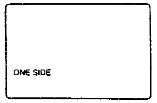
To	Press
Stop play	■ STOP
Pause play	❚❚ PAUSE
Resume play after pause	❚❚ PAUSE or ▷ PLAY
Scan forward or backward	◀◀/▶▶ SCAN
Skip chapters or tracks	◀◀❙/❙▶▶ ACS/AMS
Remove the disc	≜ OPEN/CLOSE

Tips

- When playing a double-sided LD, the player determines that the upper side of the disc is side "A" and the other side is "B," regardless of the label "A" or "B" printed on the disc.
- When playback of LD side B ends, the player stops.
- When playing side A of an LD, CD or CDV, or when the player is stopped, the SIDE A indicator on the player lights up. When playing side B of an LD, the SIDE B indicator lights up.

To start playing from the beginning of either LD side
Press DISC SIDE A to play the upper side of the LD from the beginning.
Press DISC SIDE B to play the other side of the LD from the beginning.

To play only one side of an LD.
Press 1/SIDE/ALL twice. "ONE SIDE" appears briefly.
Press ▷ (Play) or DISC SIDE A/B.
The current side of the LD is played once.



To stop playing and turn off the player
Press POWER.
You can resume playback from the point you stopped at by simply pressing ▷ PLAY (See "Resuming LD playback" on page **10**).

To stop playing and remove the disc
Press ≜ OPEN/CLOSE.
Remove the disc and press ≜ again to close the empty tray.

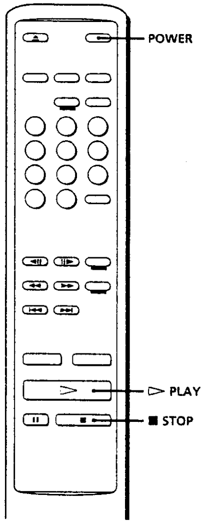
To pause playing just before starting
Press **II** PAUSE instead of doing step **4** on page **8**.
The disc tray closes and the player waits at the start of the disc until you press ▷ PLAY or **II** PAUSE. If you want to start from side B of an LD, press **II** PAUSE, then DISC SIDE B.

Chapter/Track number display on the front panel

Indication	Current status of the player
12	Playing or pausing in chapter/track 12
12 (flashes)	Searching for chapter/track 12
- - (flashes)	Searching for the beginning of the disc
00	Playing chapter "0" of an LD
0	Stopped
Not lit	No disc is loaded or playing an LD which has no chapters

Additional Operations

Resuming LD playback (Auto Resume)



Tips

- Each time you stop playing, the point where you stopped is stored.
- The point where you stopped playing is cleared when:
  - you press ≜ OPEN/CLOSE, DISC SIDE A/B or ◄◄/►►I ACS/AMS.
  - you carry out a Chapter Search or Frame/Time Search.

Note

- If you press ▷ PLAY when the power is off, the player turns on automatically. If a disc is loaded, playback resumes where you last stopped.

This function can only be used for LDs. Once you stop playing by pressing ■ STOP or POWER, the player stores the point you stopped at so that you can continue viewing from the same point.

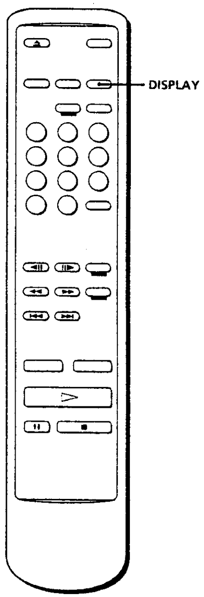
1 **Press ■ STOP (or POWER) to stop playback.**
The AUTO RESUME indicator on the player lights up and the point you stopped at is stored. (When you press POWER, the indicator lights up briefly, then goes off with the power.)

2 **Press ▷ PLAY.**
The player searches for the scene where you stopped playing, then playback starts.

To pause playing just before starting
When the player is turned on, press **II** PAUSE instead of ▷ PLAY.
When the player is turned off, press POWER or ▷ PLAY to turn on the player, then press **II** PAUSE.

To view from the beginning of the LD
Press DISC SIDE A to start playing from the beginning of side A.
Press DISC SIDE B to start playing from the beginning of side B.
The point where you stopped is cleared.

Understanding on-screen indications

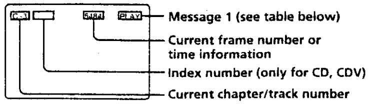


Notes
- When playing an LD which does not contain chapters, the chapter number does not appear.
- When playing a CLV LD which does not contain time data to the second, a two-digit number such as "22:", meaning 22 minutes, appears.

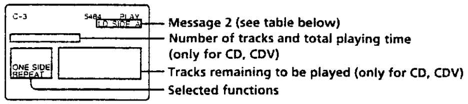
You can view the operating status of the player or disc information on the TV screen.

Displaying on-screen indications

Press DISPLAY.
The operating status of the player is displayed on the screen.


Message 1 (see table below)
Current frame number or time information
Index number (only for CD, CDV)
Current chapter/track number

Press DISPLAY again.
Operating status and disc information are displayed on the screen.


C-3
LD SIDE A
ONE SIDE REPEAT
Message 2 (see table below)
Number of tracks and total playing time (only for CD, CDV)
Tracks remaining to be played (only for CD, CDV)
Selected functions

Press DISPLAY once again to turn off the indications.

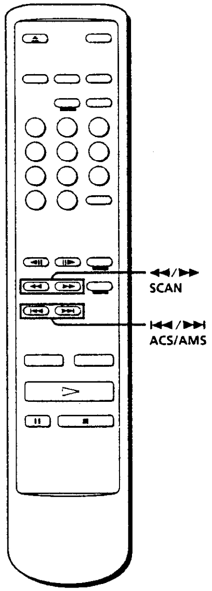
Message 1

Display	Current status of the player
OPEN	Disc tray open
CLOSE	Disc tray closed
PLAY	Playing a disc
STOP	Playback stopped
PAUSE	Playback temporarily stopped
◀◀/▶▶	Speed scanning
SEARCH	Searching

Message 2

Display	Currently playing
LD SIDE A	Side A of LD
LD SIDE B	Side B of LD
CD	CD
CDV	CDV
1/L	First soundtrack/left channel
2/R	Second soundtrack/right channel
♪ DIGITAL	Digital sound
♪ ANALOG	Analog sound

Searching for a particular point on the disc


◀◀/▶▶
SCAN
|◀◀/▶▶|
ACS/AMS

Note
- A certain amount of visual noise and instability is inevitable when scanning an LD.

Tips
- ACS/AMS stands for Automatic Chapter Search/Automatic Music Search.
- In addition to normal play mode, you can conduct Speed Scan and Skip Search while in Freeze Frame (CAV LD), Repeat or Pause mode. After the scan or search, playback continues in the same mode.

The LD player has various "search" functions. You can locate a particular point on a disc by scanning scenes or skipping chapters/tracks. You can also specify a chapter/track number directly.

Scanning a disc quickly (Speed Scan)

Hold down ◀◀/▶▶ SCAN while playing the disc.

To	Hold down
Scan forward	▶▶ SCAN
Scan backward	◀◀ SCAN

To resume normal playback, release ◀◀/▶▶ SCAN.

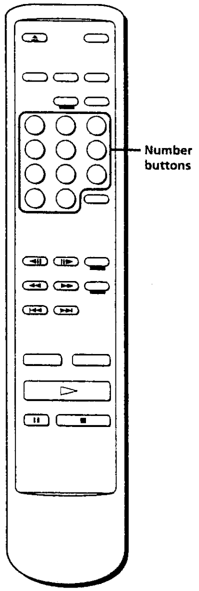
Skipping chapters or tracks (Skip Search)

Press or hold down |◀◀/▶▶| ACS/AMS.

To go to the beginning of	Press
Next chapter/track	▶▶| ACS/AMS once
Current chapter/track	|◀◀ ACS/AMS once
Previous chapter/track	|◀◀ ACS/AMS twice before the picture or sound resumes

Hold down ▶▶| or |◀◀ to skip chapters/tracks continuously.

Specifying a chapter or track directly (Chapter/Track Search)



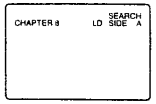
Tips
- In addition to normal play mode, you can conduct Chapter/Track Search while in Freeze Frame (CAV LD), Repeat or Pause mode. When the specified chapter or track is located after the search, playback continues in the same mode.

Note
- Chapter Search does not function properly if the disc does not contain chapter numbers, or if the chapter number entered does not exist.

LDs are divided into sections called "chapters." CDs and CDVs are divided into sections called "tracks." Simply enter the desired chapter/ track number to go to a chapter or track and start playing it immediately.

Locating a particular chapter/track

Press one of the number buttons to enter the chapter/track number.

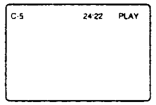


To play a chapter on the opposite side of the LD, press DISC SIDE B (or A), then enter the chapter number.

To enter a number greater than 10, press (+10), then one of the ⓪ - ⑨ buttons. If you press (+10) by mistake, press CLEAR, then enter the correct number.

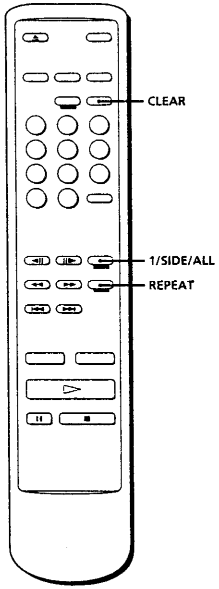
To	Press
Enter 14	(+10) , then ④ .
Enter 25	(+10) , (+10) , then ⑤
Enter 30	(+10) , (+10) , (+10) , then ⓪

To check the current chapter/track number on the screen
Press DISPLAY to display the chapter track number.
The number appears in the upper left-hand corner of the screen. If the LD does not contain chapter numbers, no number is displayed.



To play only one chapter/track
Press 1/SIDE/ALL once. "SINGLE" appears briefly.
Enter the chapter/track number using the number buttons.
The chapter or track is played once.

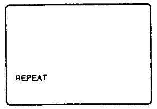
Playing repeatedly (Repeat Play)



Repeat play allows you to play the disc over and over. You can replay both sides, a single side or one chapter of an LD, and a whole disc or a single track on a CD.

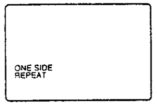
Repeating the whole disc (All Disc Repeat)

Press REPEAT while playing the disc.
"REPEAT" appears on the screen briefly. When playing an LD, the player plays through both sides of the LD repeatedly. When playing a CD or CDV, the player plays all the tracks on the disc repeatedly.



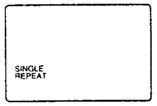
Repeating the current side of the LD (One Side Repeat)

Press 1/SIDE/ALL twice, then REPEAT while playing the disc.
"ONE SIDE" and "REPEAT" appear briefly. The player plays the current disc side repeatedly.



Repeating the current chapter/track (Single Repeat)

Press 1/SIDE/ALL once, then REPEAT while playing the disc.
"SINGLE" and "REPEAT" appear briefly. The player plays the current chapter/track repeatedly.

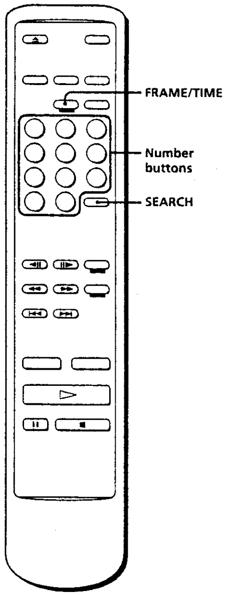


To check the replaying status
Press DISPLAY twice.

Cancelling Repeat Play

Press CLEAR.

Searching by frame number or time (Frame/Time Search)



Tip

- In addition to normal play mode, you can conduct Frame/Time Search while in Freeze Frame, Repeat or Pause mode. When the specified chapter or track is located after the search, playback continues in the same mode.

Note

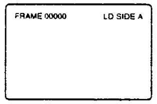
- If you enter a frame/time number which does not exist on the disc, the last scene on the current side of the LD is played.

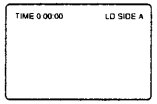
Video scenes are counted as a series of still pictures or "frames." When playing a CAV (standard-play) LD, the player keeps track of the number of frames. So, you can locate a scene on the CAV disc by specifying the frame number. When playing a CLV (extended-play) LD, the player keeps track of the elapsed playing time. So, you can locate a particular point on the CLV LD by specifying the total elapsed time.

Entering the frame number or elapsed time

1 **Press FRAME/TIME while playing the disc.**

When playing	Indication
CAV LD	FRAME 00000
CLV LD	TIME 0:00:00





2 **Enter the multi-digit number corresponding to the frame or time you want to locate.**
To locate frame number 12340 on the CAV LD, press the number buttons in the order, ①, ②, ③, ④ and ⓪.

To locate the 12 minutes, 5 second point on the CLV LD, press the number buttons in the order, ①, ②, ⓪ and ⑤.

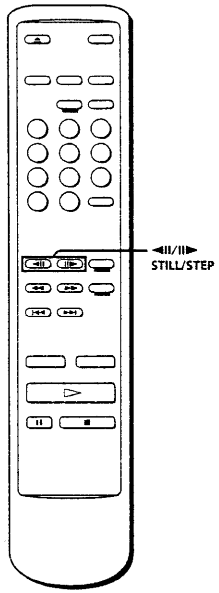
If you enter the wrong number, press FRAME/TIME to clear the number, then enter the correct number.

3 **Press SEARCH.**
Playback starts from the frame or time you specified.

To check the frame number or time
Press DISPLAY.
The current frame number or time is displayed on the screen.

To cancel Frame/Time Search
Press CLEAR before pressing SEARCH.

Viewing frame-by-frame action



Tip

- When you play a CLV LD, Freeze Frame and Step Play are not available. When you press **II** PAUSE, the screen goes blank. If you press **◀II /II▶** STILL/STEP, "CLV SIDE A" appears briefly.

This function can only be used for CAV LDs. On any scene, you can freeze an action into a still picture, or advance or reverse the action frame-by-frame.

Freezing the action (Freeze Frame)

Press **II** PAUSE or one of the **◀II/II▶** STILL/STEP buttons while playing a CAV LD.
The sound mutes and the picture freezes.

To resume normal playback
Press ▷ PLAY.

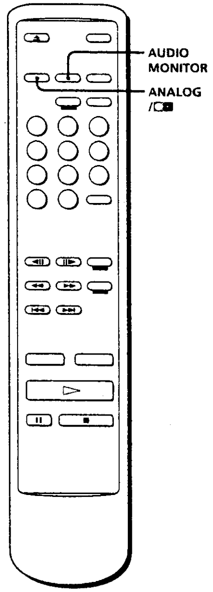
Playing frame-by-frame (Step Play)

1 **Press one of the ◀II/II▶ STILL/STEP buttons while playing a CAV LD.**
The sound mutes and the picture freezes.

2 **Press ◀II or II▶ repeatedly to advance or reverse the action frame-by-frame.**
Hold down **◀II** or **II▶** to view continuous frame-by-frame action.

To resume normal playback
Press ▷ PLAY.

Using the sound control functions



Note
- The output level may differ between digital and analog sound.

Playing a stereo disc or Second Audio Programme (SAP) disc

When playing SAP discs such as bilingual discs, you can alternate the sound output using AUDIO MONITOR.

To alternate the sound output
Press AUDIO MONITOR while playing the disc.
Each time you press AUDIO MONITOR, the on-screen indication changes as follows:

→ 1/L → 2/R → 1/L 2/R ┐

The indication appears on the screen briefly, then disappears.

Indication	From stereo disc	From SAP disc
1/L	Left channel	Sound track 1 (Left channel)
2/R	Right channel	Sound track 2 (Right channel)
1/L 2/R	Stereo (Both channels)	Sound track 1 (Left channel) Sound track 2 (Right channel)

When you select 1/L (or 2/R), the sound of the left (or right) channel is output from both speakers.

Listening to analog sound on an LD

If your LD contains digital soundtracks, the player automatically outputs digital sound. To listen to sound recorded on analog soundtracks, use ANALOG/CX.

Press ANALOG/CX while playing the disc.
"♪ ANALOG" appears on the screen briefly and analog sound is output.

To return to digital sound
Press ANALOG/CX repeatedly until "♪ DIGITAL" appears on the screen.

Discs with a CX (CX) logo

LDs bearing the CX logo are recorded with the CX noise reduction system, which gives lower noise level and higher dynamic range on analog sound. The player detects most CX discs and activates the CX noise reduction system automatically when outputting analog sound. If your CX LD does not contain a code to activate the CX noise reduction system, you can activate the CX noise reduction system manually while playing only analog sound. Press ANALOG/CX repeatedly until "CX ON" appears. The CX noise reduction system is activated.

Optical discs

The MDP-MR1 can play all three types of optical discs currently available for home entertainment, laser discs (LD; recorded in NTSC standard), compact discs (CD) and compact disc videos (CDV).*

Disc class	Disc logo	Disc type	Size	Play side	Play time	
Laser Discs For movies, operas, and concerts	LASER DISC	LD Single	8 in. (20 cm)	Single Side	CAV	14 min
					CLV	20 min
		8-inch LD	8 in. (20 cm)	Double Side	CAV	28 min
					CLV	40 min
	LaserVision	12-inch LD	12 in. (30 cm)	Double Side	CAV	1 hr
					CLV	2 hr
Compact Discs For music	COMPACT DISC DIGITAL AUDIO	CD Single	3 in. (8 cm)	Single Side	20 min	
		CD	5 in. (12 cm)	Single Side	74 min	
Compact Disc Videos For music videos and educational material (Digital Audio)	CD VIDEO	CDV	5 in. (12 cm)	Single Side	Video+Audio 5 min Audio 20 min	
	VIDEO SINGLE DISC	VSD	5 in. (12 cm)	Single Side	Video+Audio 5 min	

Multi audio discs

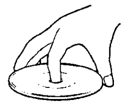
digital AUDIO MULTI AUDIO

Discs with these logos contain separate analog and digital tracks which may differ in content.

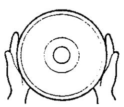
* The MDP-MR1 cannot play the following discs or functions:
- CED, VHD discs or PAL video discs
- CD-ROM, CD-GRAPHICS, VIDEO CD, Photo CD, CD-I discs
- Aluminum-lined discs or MD (MiniDisc) discs
- Graphic functions of LD-G discs

Optical Disc Maintenance

Holding CDs or CDVs
Hold CDs or CDVs by putting your index finger through the centre hole and grasping the edge of the disc with the thumb and other fingers as pictured in the illustration.



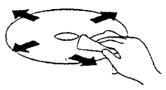
Holding LDs
Hold LDs by grasping the outside edge in both hands as illustrated.



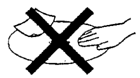
Light Exposure
Do not expose the disc to direct sunlight or heat sources such as hot air ducts, or leave the disc in a car parked in direct sunlight where there can be a considerable rise in temperature.

Cracked or Damaged Discs
Do not play cracked or damaged discs, or try to play discs that have been repaired with adhesive glues.

Keeping the Disc Surface Clean
Clean the surface of the disc before playing, using a soft, dry, cleaning cloth. Wipe the disc from the centre out. Do not use solvents such as benzine, paint thinner, commercially available cleaners, or anti-static spray intended for LP record discs.



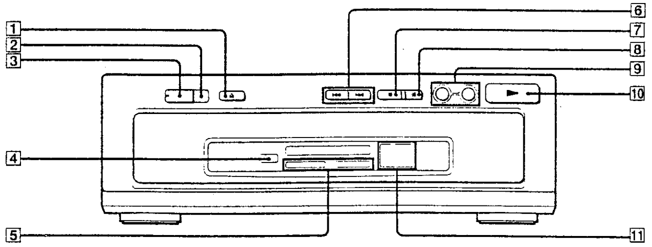
To prevent marring, after playing, remove the disc and put it back into its jacket.
Putting your fingers on, or adhering anything to the surface of the disc such as sticky note pad paper or adhesive tape will deteriorate the quality of the playing surface, and thus the output quality.



Index to parts and controls

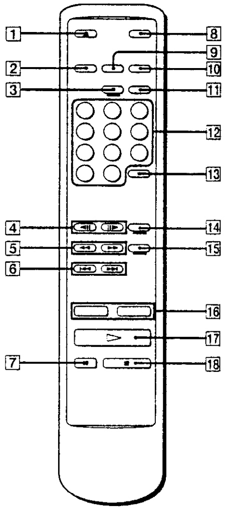
See the pages indicated in ( ) for details.

Front



1 ≙ OPEN/CLOSE button (8)
2 Remote sensor (18)
3 POWER switch and indicator (8)
ON: Green
STANDBY: Red
4 AUTO RESUME indicator (10)
5 SIDE A/B indicators (9)
6 ◀◀ / ▶▶I ACS/AMS buttons (12)
7 ■ (Stop) button (8)
8 ❚❚ (Pause) button (8)
9 SIDE A/B buttons (9)
10 ▶ (Play) button and indicator (8)
11 Chapter/track number indicator (9)

Remote commander

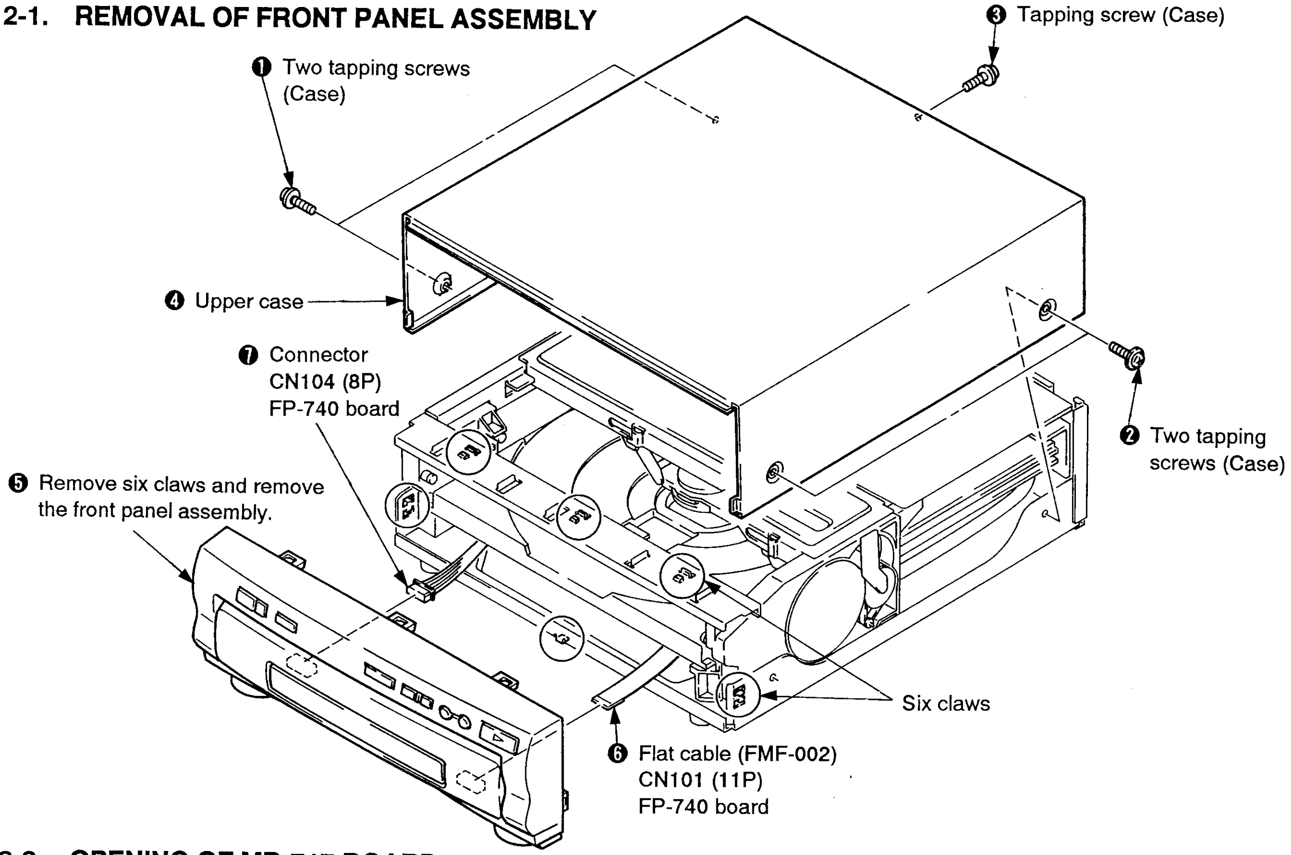


1 ≙ OPEN/CLOSE button (8)
2 ANALOG/▢ button (17)
3 FRAME/TIME button (15)
4 ◀❚❚/❚❚▶ STILL/STEP buttons (16)
5 ◀◀/▶▶ SCAN buttons (12)
6 I◀◀/▶▶I ACS/AMS buttons (12)
7 ❚❚ PAUSE button (8)
8 POWER switch (8)
9 AUDIO MONITOR button (17)
10 DISPLAY button (11)
11 CLEAR button (14) (15)
12 Number buttons (13) (15)
13 SEARCH button (15)
14 1/SIDE/ALL button (9) (13) (14)
15 REPEAT button (14)
16 DISC SIDE A/B buttons (9)
17 ▷ PLAY button (8)
18 ■ STOP button (8)

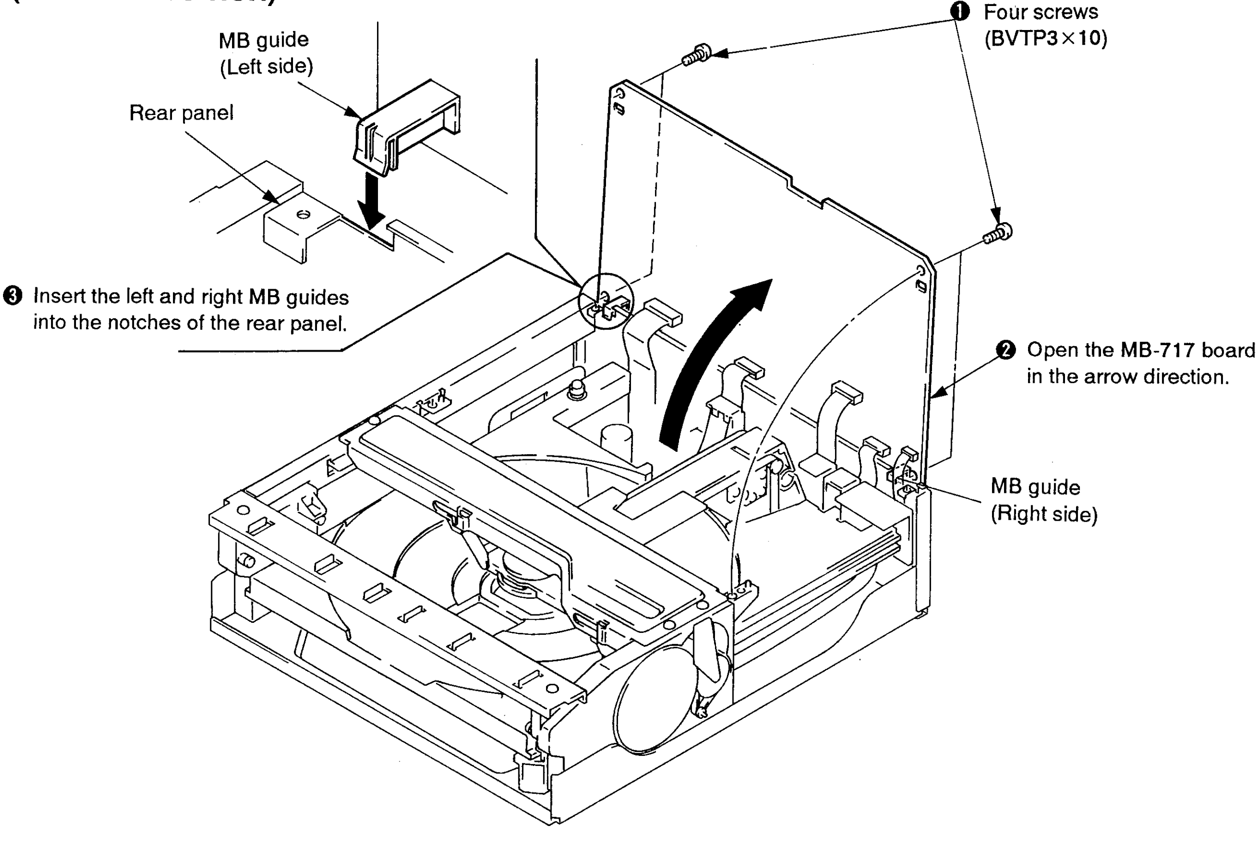
A function activated by pressing a button with an orange mark can be cancelled by pressing the CLEAR button.

SECTION 2
DISASSEMBLY

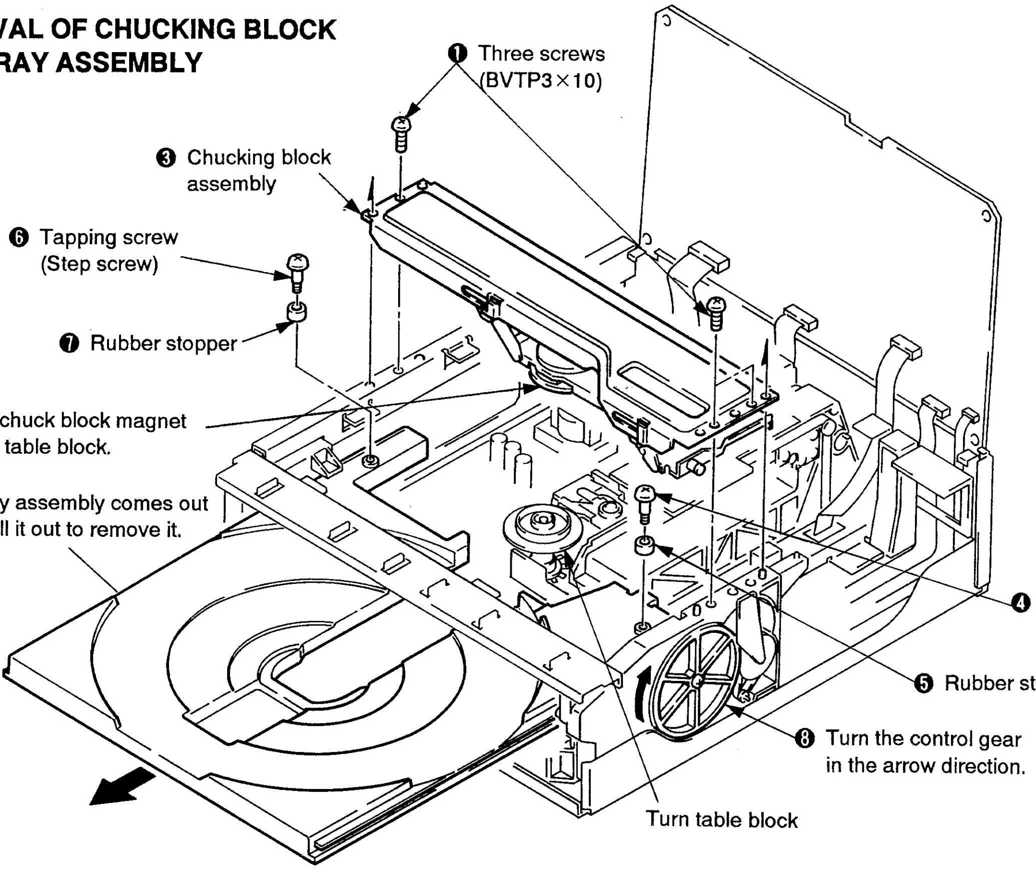
2-1. REMOVAL OF FRONT PANEL ASSEMBLY


❸ Tapping screw (Case)
❶ Two tapping screws (Case)
❹ Upper case
❼ Connector CN104 (8P) FP-740 board
❷ Two tapping screws (Case)
❺ Remove six claws and remove the front panel assembly.
Six claws
❻ Flat cable (FMF-002) CN101 (11P) FP-740 board

2-2. OPENING OF MB-717 BOARD (SERVICE POSITION)


MB guide (Left side)
Rear panel
❶ Four screws (BVTP3×10)
❸ Insert the left and right MB guides into the notches of the rear panel.
❷ Open the MB-717 board in the arrow direction.
MB guide (Right side)

2-3. REMOVAL OF CHUCKING BLOCK AND TRAY ASSEMBLY



❶ Three screws (BVTP3×10)

❸ Chucking block assembly

❻ Tapping screw (Step screw)

❼ Rubber stopper

❷ Remove the chuck block magnet from the turn table block.

❾ When the tray assembly comes out of the set, pull it out to remove it.

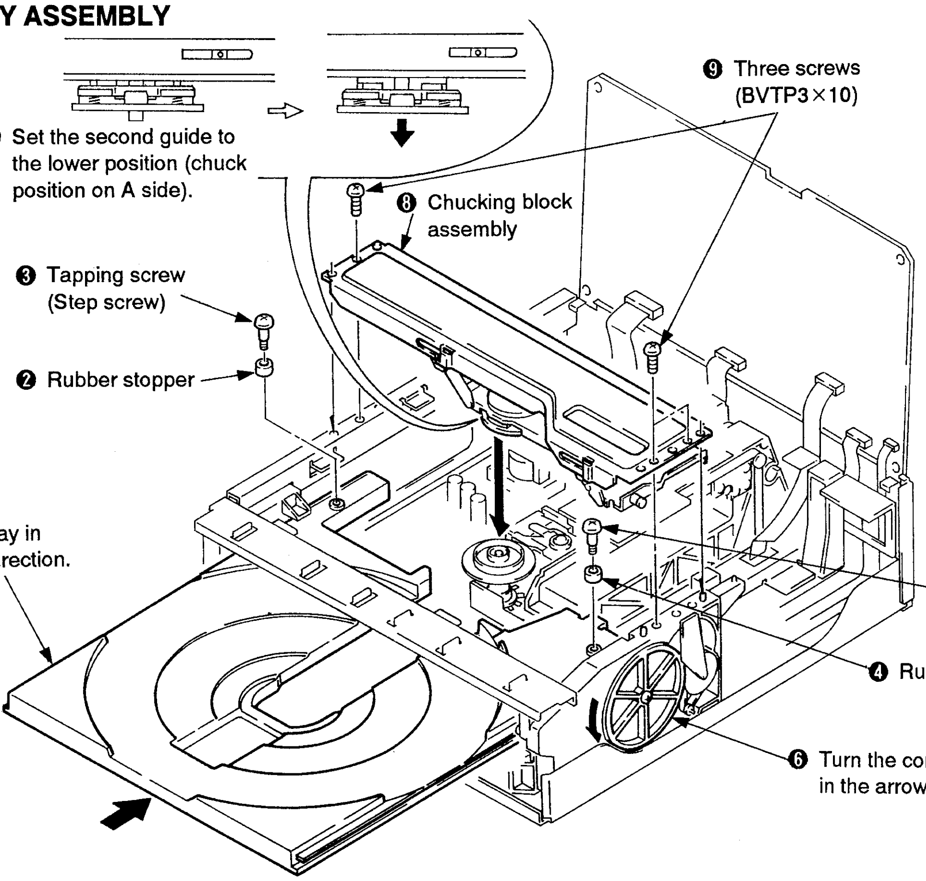
❹ Tapping screw (Step screw)

❺ Rubber stopper

❽ Turn the control gear in the arrow direction.

Turn table block

2-4. MOUNTING THE CHUCKING BLOCK AND TRAY ASSEMBLY



❾ Three screws (BVTP3×10)

❼ Set the second guide to the lower position (chuck position on A side).

❽ Chucking block assembly

❸ Tapping screw (Step screw)

❷ Rubber stopper

❶ Insert the tray in the arrow direction.

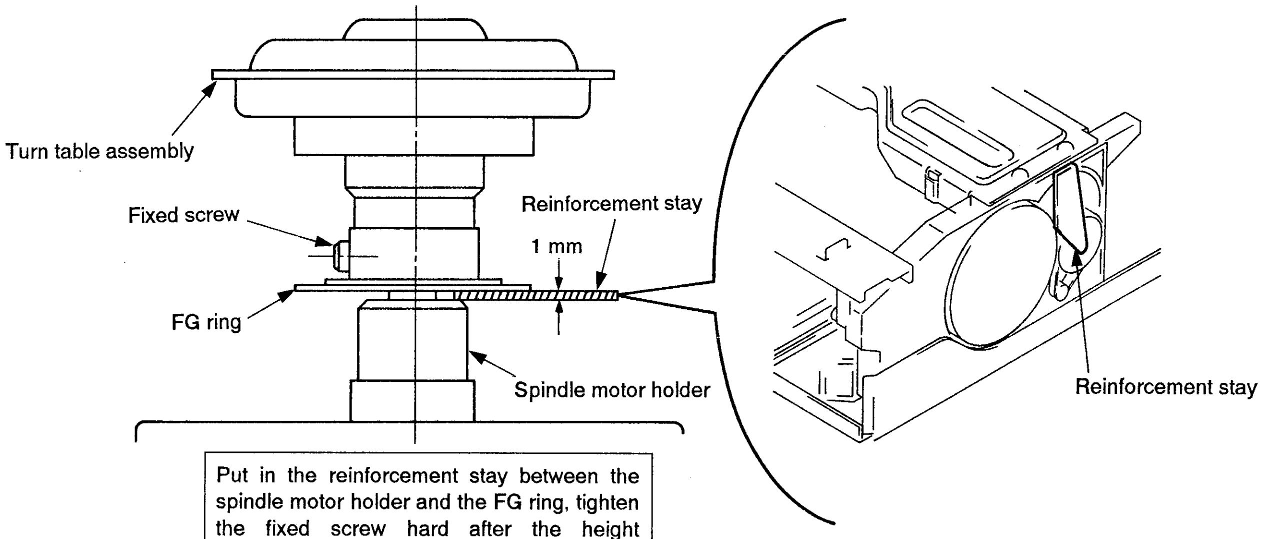
❺ Tapping screw (Step screw)

❹ Rubber stopper

❻ Turn the control gear in the arrow direction.

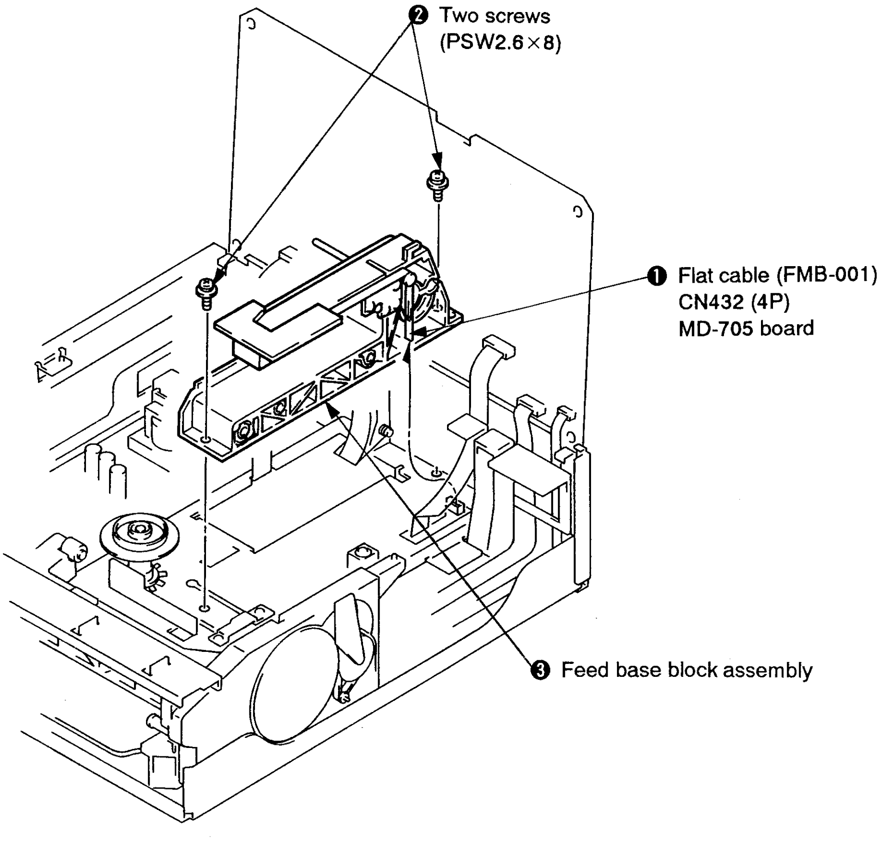
2-5. HEIGHT ADJUSTMENT OF THE TURN TABLE ASSEMBLY

1. Rotate the control gear on the right side of the set, and open the tray.
2. Remove the chucking block assembly.
3. Remove the reinforcement stay.
4. Change the turn table assembly.
   Adjust the height and also the position putting in the reinforcement stay as below.
   The thickness of the reinforcement is 1 mm.
5. Fix the reinforcement to fixed position.

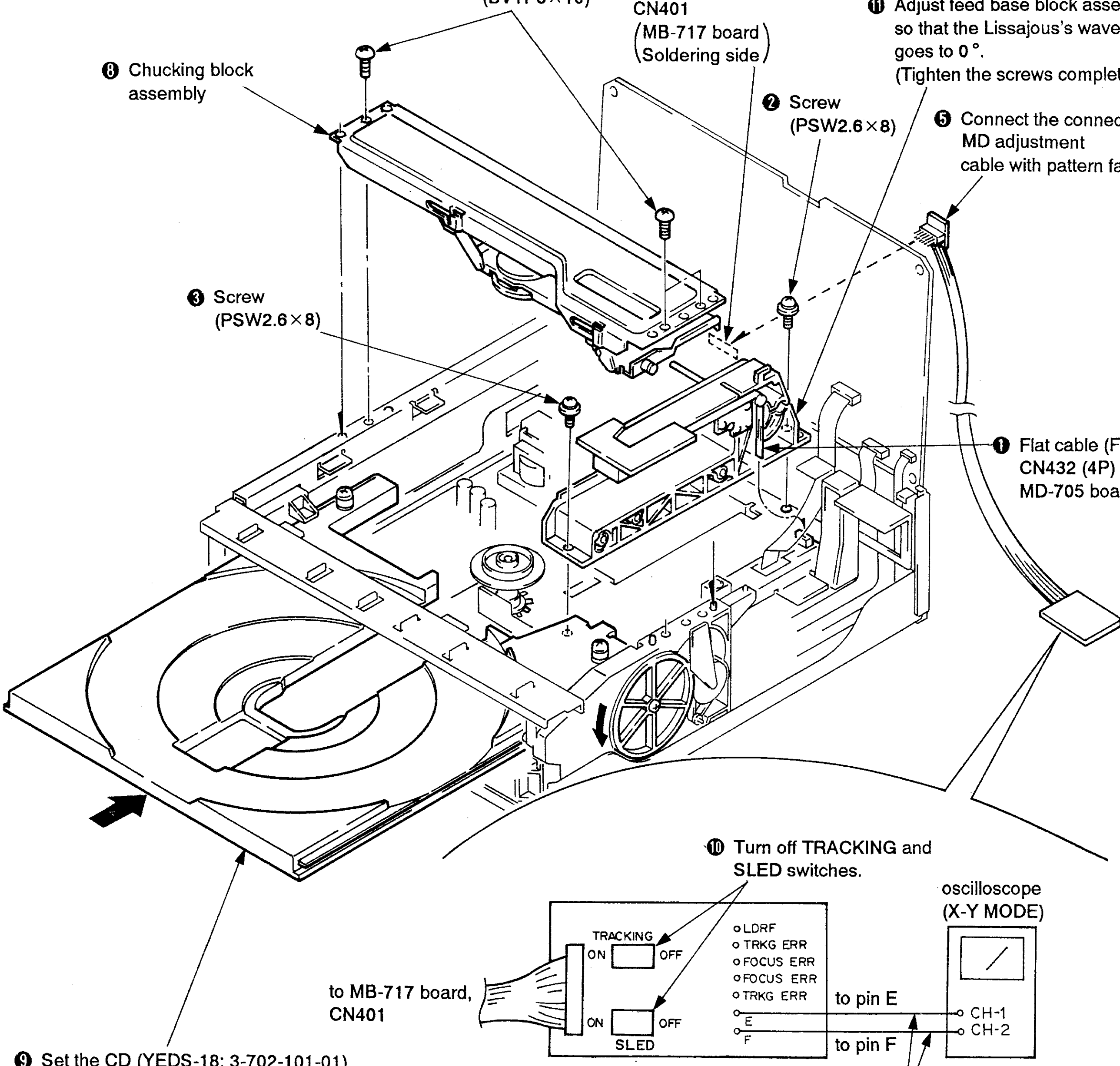

Turn table assembly
Fixed screw
FG ring
Reinforcement stay
1 mm
Spindle motor holder
Reinforcement stay

Put in the reinforcement stay between the spindle motor holder and the FG ring, tighten the fixed screw hard after the height adjustment.

2-6. REMOVAL OF FEED BASE BLOCK ASSEMBLY


❷ Two screws (PSW2.6×8)
❶ Flat cable (FMB-001) CN432 (4P) MD-705 board
❸ Feed base block assembly

2-7. MOUNTING THE FEED BASE BLOCK ASSEMBLY



CN401
(MB-717 board Soldering side)
TRACKING
ON
OFF
ON
OFF
SLED
o LDRF
o TRKG ERR
o FOCUS ERR
o FOCUS ERR
o TRKG ERR
E
F
to pin E
to pin F
CH-1
CH-2
oscilloscope (X-Y MODE)
to MB-717 board, CN401
MD adjustment cable (J-6082-059-B)

❶ Flat cable (FMB-001) CN432 (4P) MD-705 board

❷ Screw (PSW2.6×8)

❸ Screw (PSW2.6×8)

❹ Fix feed base block assembly with screw temporarity.

❺ Connect the connector of MD adjustment cable with pattern face down.

❻ Connect CH-1 to pin E and CH-2 to pin F.

❼ Three screws (BVTP3×10)

❽ Chucking block assembly

❾ Set the CD (YEDS-18: 3-702-101-01) on the tray.
Press the PLAY (▶) button and plays the track No. 1 set PAUSE.

❿ Turn off TRACKING and SLED switches.

⓫ Adjust feed base block assembly so that the Lissajous's waveform goes to 0 °.
(Tighten the screws completely.)

⓬ Refer to 7-10. Adjustment after the attachment of the optical pick-up block. (Page:7-15)

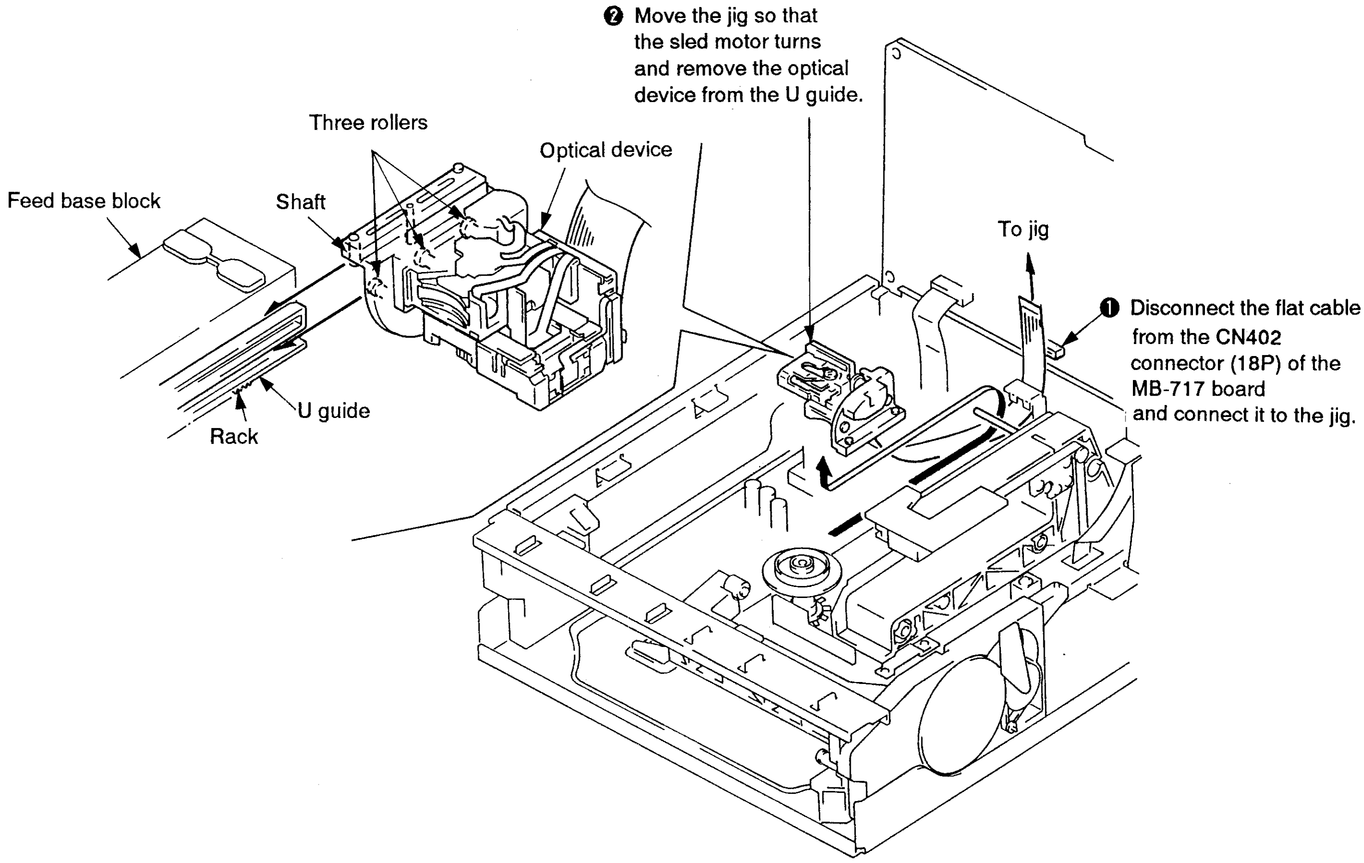
Lissajous's waveform

×	×	○
180 °	90 °	0 °
╲	○	╱

2-8. REMOVAL OF OPTICAL DEVICE (KHS-150A (S)) (1)

- Mounting

1) Insert the shaft and three rollers of the optical device into their corresponding grooves of the U guide.
2) Set so that the gear of the optical device engages with the rack of the U guide.
3) Move the jig so that the sled motor turns (in the opposite direction of removal), and mount the optical device onto the feed base block.

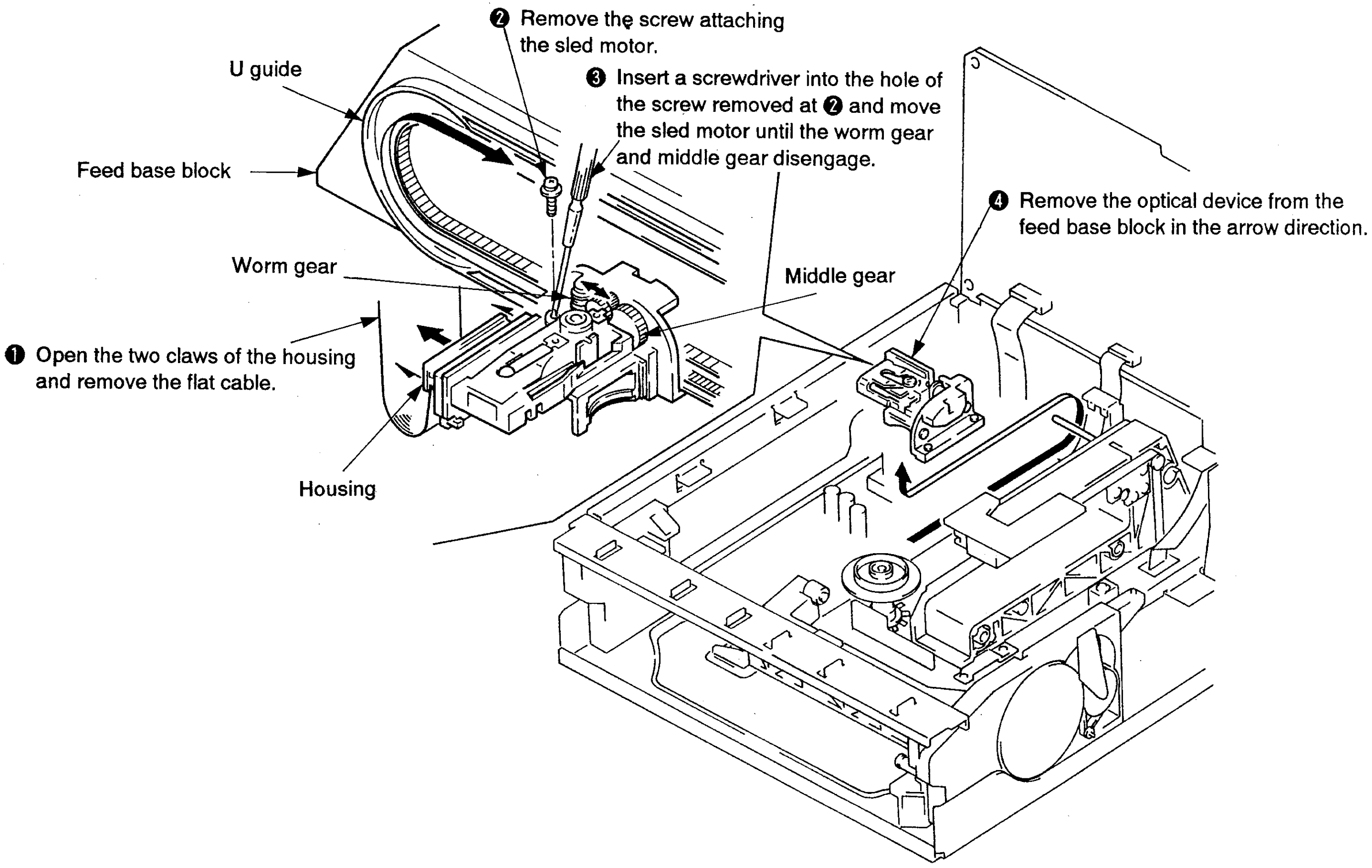


❷ Move the jig so that the sled motor turns and remove the optical device from the U guide.
Three rollers
Optical device
Feed base block
Shaft
To jig
❶ Disconnect the flat cable from the CN402 connector (18P) of the MB-717 board and connect it to the jig.
U guide
Rack

2-9. REMOVAL OF OPTICAL DEVICE (KHS-150A (S)) (2)

- Removal performed when the sled motor does not operate

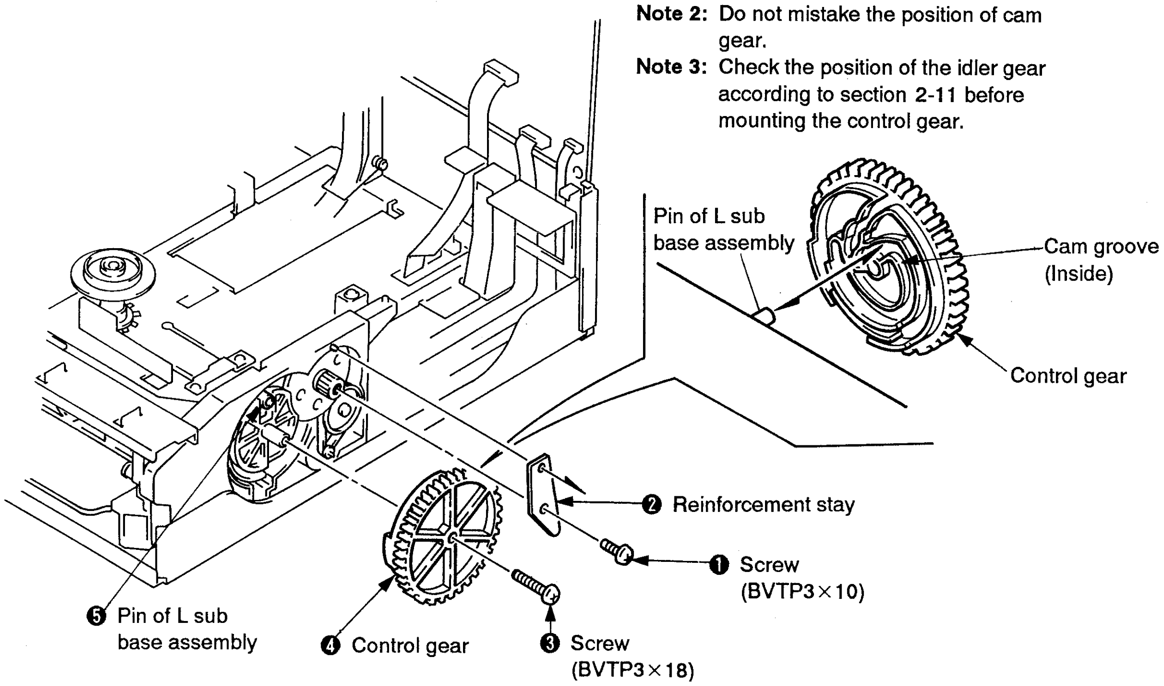
Note:
Refer to section 2-8 to mount the optical device after replacing it.


❷ Remove the screw attaching the sled motor.
❸ Insert a screwdriver into the hole of the screw removed at ❷ and move the sled motor until the worm gear and middle gear disengage.
❹ Remove the optical device from the feed base block in the arrow direction.
U guide
Feed base block
Worm gear
Middle gear
❶ Open the two claws of the housing and remove the flat cable.
Housing

2-10. REMOVAL OF CONTROL GEAR

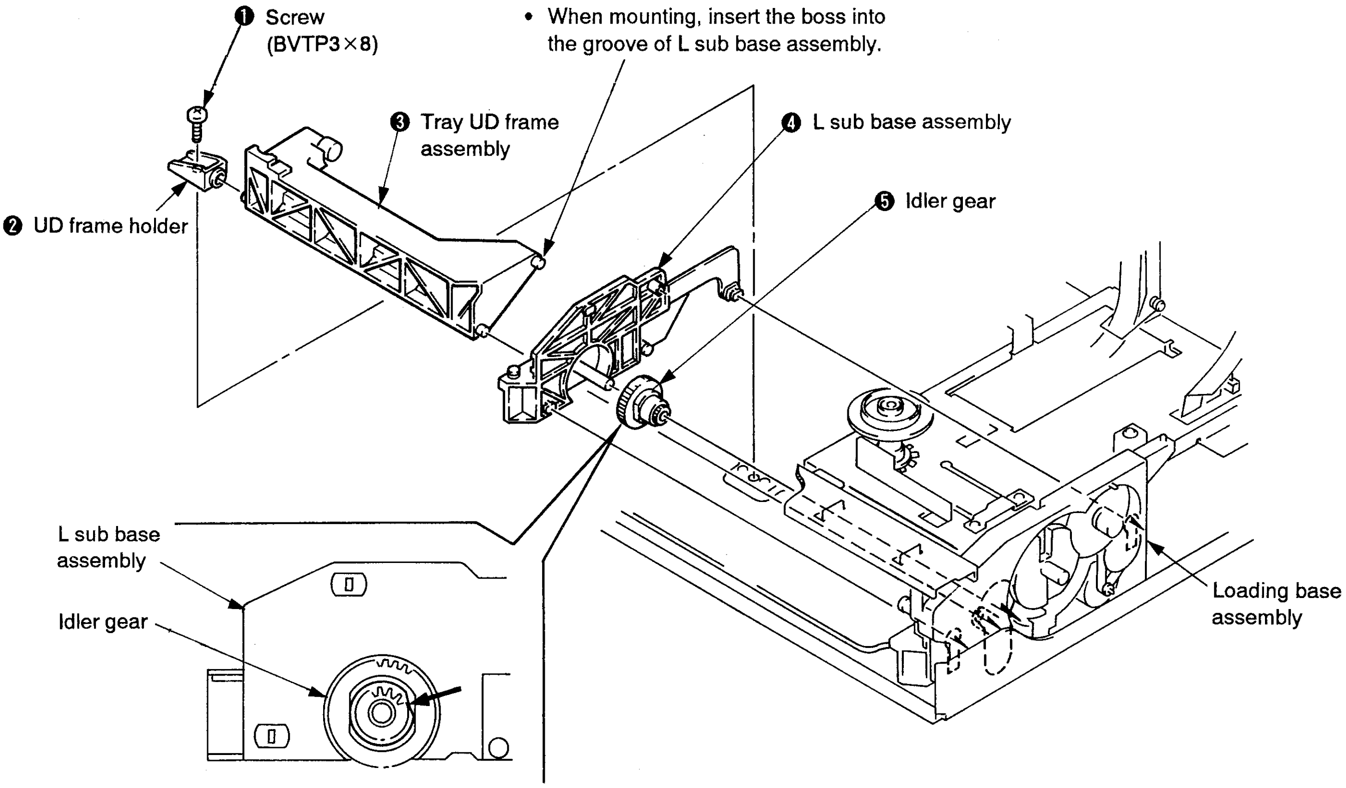
- Mounting the control gear
Lower the pin of the L sub base assembly completely and insert the pin into the cam groove (inside) of the control gear.

Note 1: Apply grease on the cam groove.
Note 2: Do not mistake the position of cam gear.
Note 3: Check the position of the idler gear according to section 2-11 before mounting the control gear.


Pin of L sub base assembly
Cam groove (Inside)
Control gear
❷ Reinforcement stay
❶ Screw (BVTP3×10)
❺ Pin of L sub base assembly
❹ Control gear
❸ Screw (BVTP3×18)

2-11. REMOVAL OF IDLER GEAR

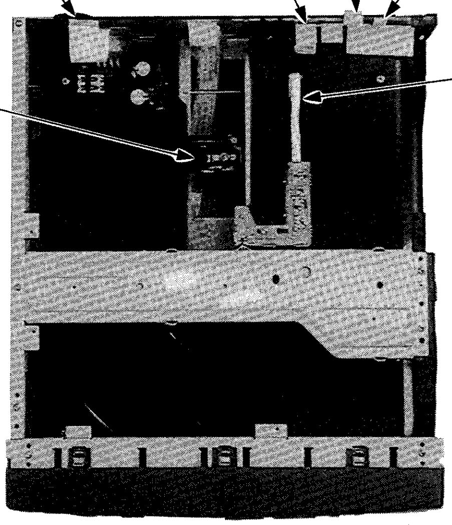
- When mounting, insert the boss into the groove of L sub base assembly.


❶ Screw (BVTP3×8)
❷ UD frame holder
❸ Tray UD frame assembly
❹ L sub base assembly
❺ Idler gear
Loading base assembly
L sub base assembly
Idler gear

- Positioning the idler gear
Mount the idler gear with its notch faced upper right (indicated by the arrow).

2-12. INTERNAL VIEWS

— Top View —



Flexible flat cable (12 core)
1-769-147-11

Flexible flat cable (19 core)
1-769-146-11

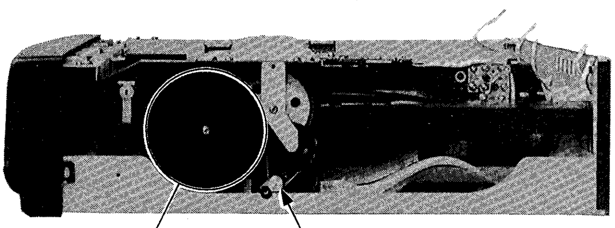
Flexible flat cable (11 core)
1-769-149-11

Flexible flat cable (7 core)
1-769-148-11

Optical device (KHS-150A (S))
8-848-286-11

Flexible flat cable (4 core)
1-769-151-11

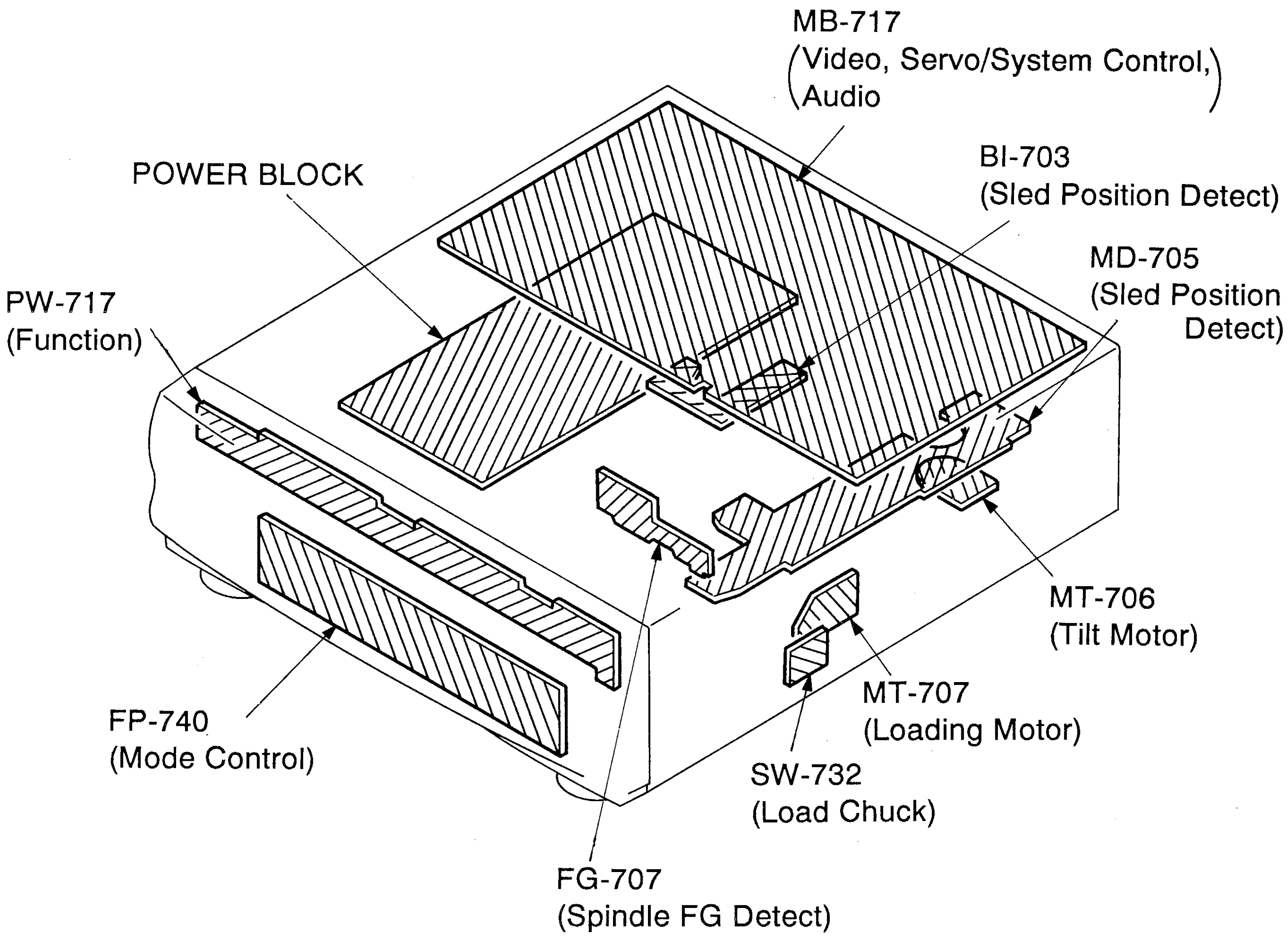
— Side View —



Control gear
3-961-083-01

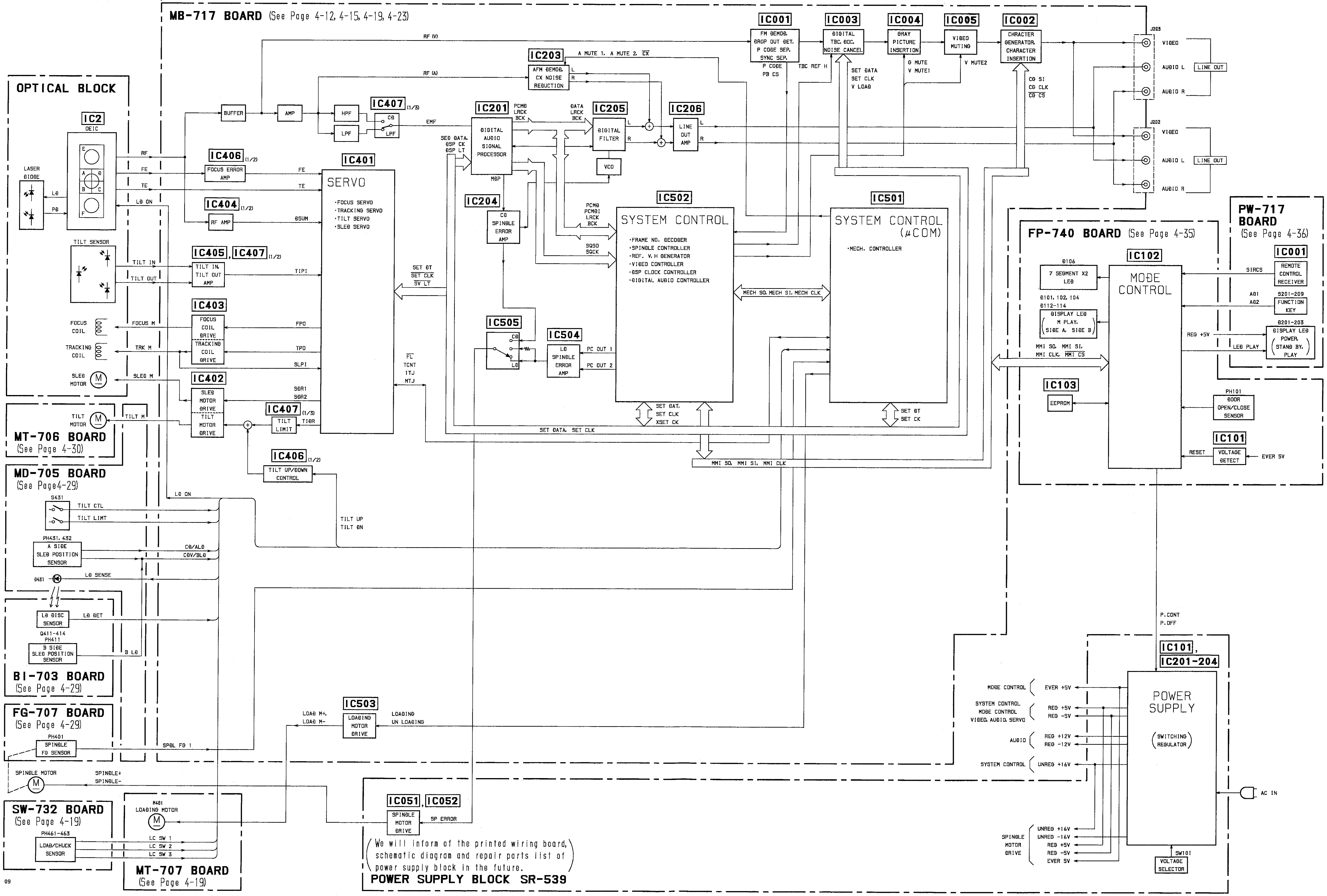
M481
Loading motor (RF-370C)
X-3944-685-1

2-13. CIRCUIT BOARDS LOCATION


MB-717
(Video, Servo/System Control, Audio)
BI-703
(Sled Position Detect)
POWER BLOCK
MD-705
(Sled Position Detect)
PW-717
(Function)
MT-706
(Tilt Motor)
MT-707
(Loading Motor)
FP-740
(Mode Control)
SW-732
(Load Chuck)
FG-707
(Spindle FG Detect)

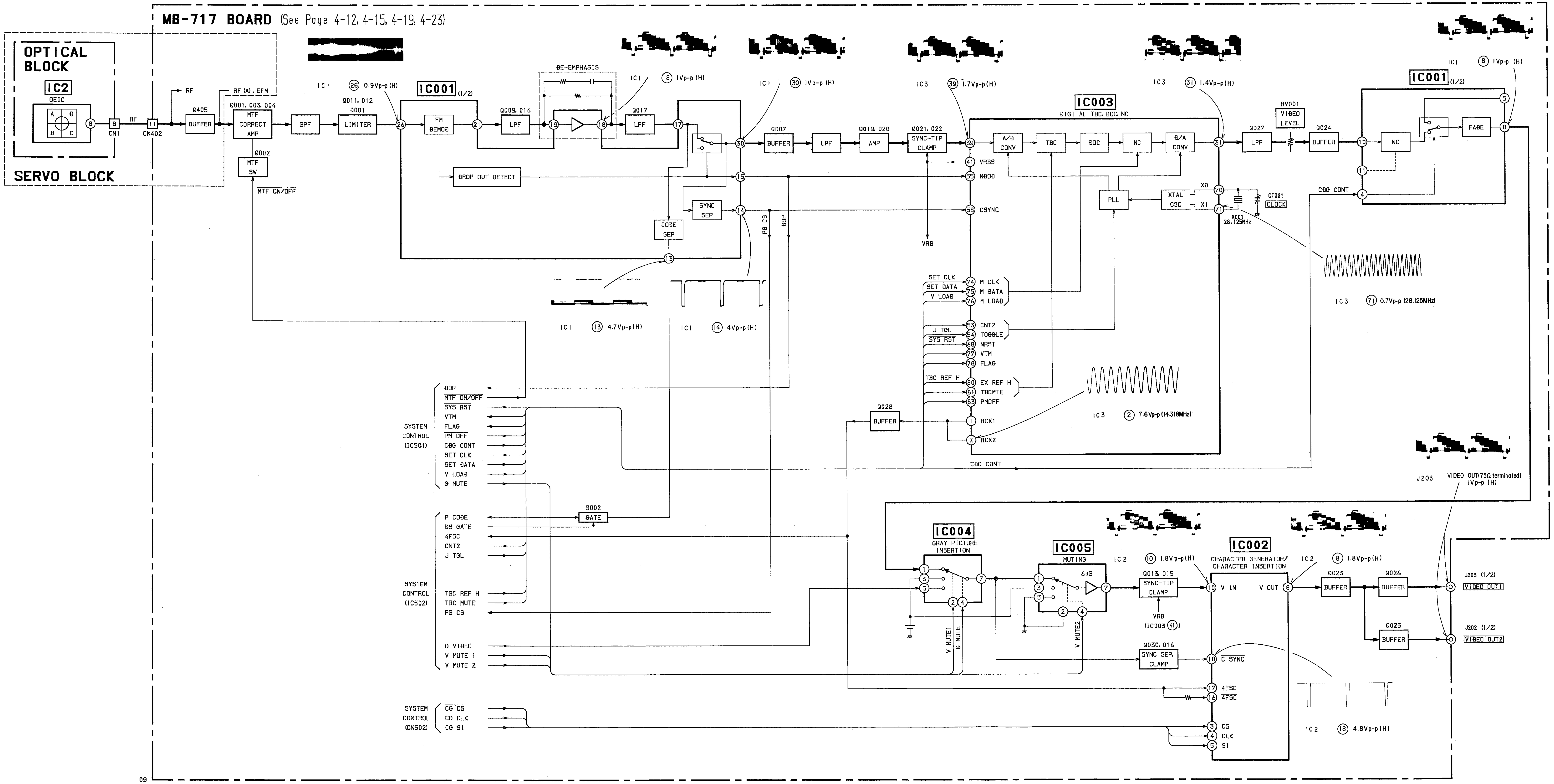
SECTION 3
BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM

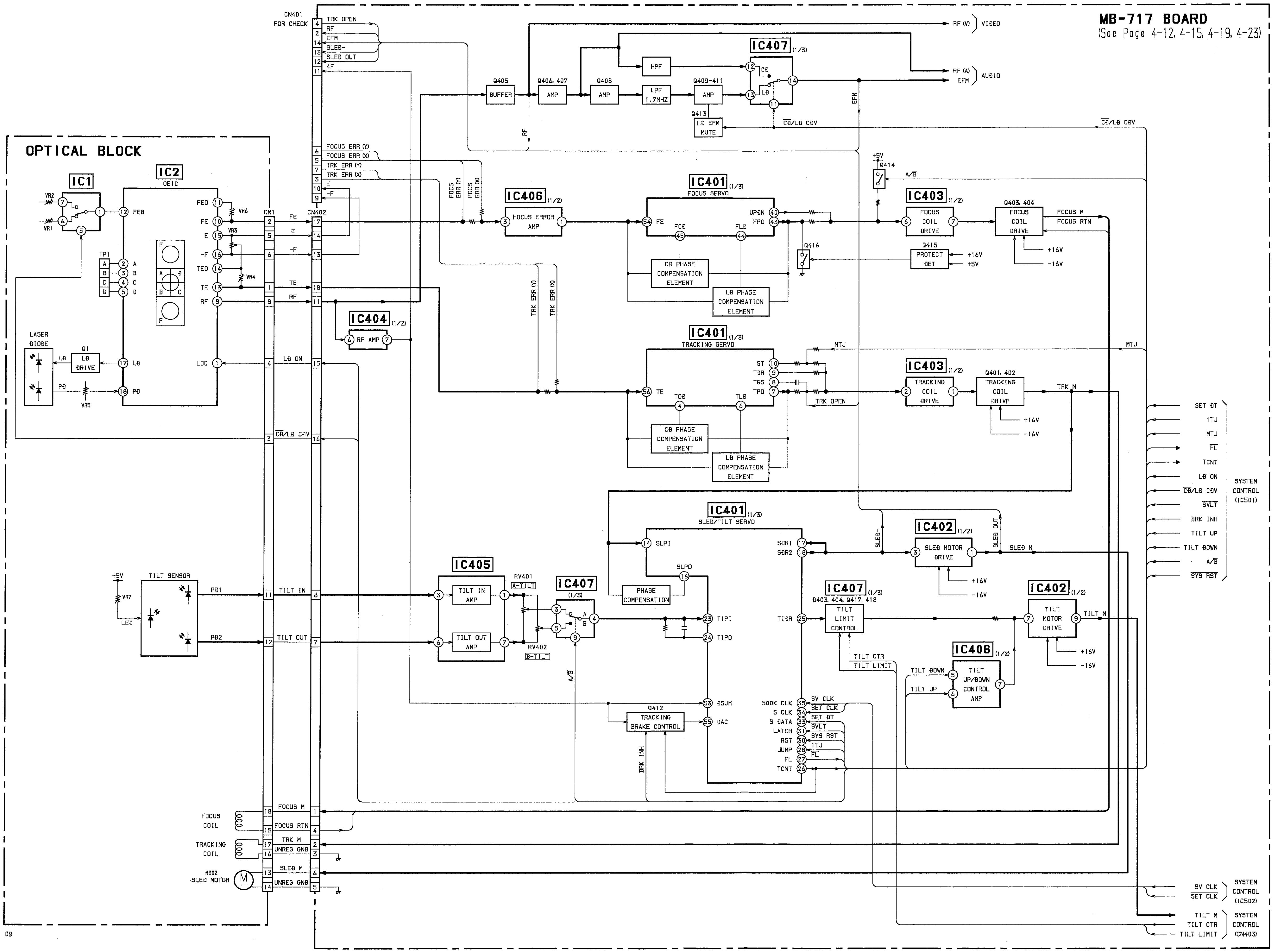

MB-717 BOARD (See Page 4-12, 4-15, 4-19, 4-23)
OPTICAL BLOCK
IC2
DEIC
LASER DIODE
LD
PD
TILT SENSOR
FOCUS COIL
TRACKING COIL
SLED MOTOR
RF
FE
TE
LD ON
TILT IN
TILT OUT
FOCUS M
TRK M
SLED M
TILT M
TILT MOTOR
MT-706 BOARD (See Page 4-30)
MD-705 BOARD (See Page 4-29)
S431
TILT CTL
TILT LIMT
PH431, 432
A SIDE SLED POSITION SENSOR
D431
LD SENSE
CD/ALD
CDV/BLD
BI-703 BOARD (See Page 4-29)
LD DISC SENSOR
LD DET
Q411-414
PH411
B SIDE SLED POSITION SENSOR
B LD
FG-707 BOARD (See Page 4-29)
PH401
SPINDLE FG SENSOR
SPDL FG 1
SPINDLE MOTOR
SPINDLE+
SPINDLE-
SW-732 BOARD (See Page 4-19)
PH461-463
LOAD/CHUCK SENSOR
M481
LOADING MOTOR
LC SW 1
LC SW 2
LC SW 3
MT-707 BOARD (See Page 4-19)
BUFFER
AMP
HPF
LPF
IC407 (1/3)
CD
EMF
IC406 (1/2)
FOCUS ERROR AMP
IC404 (1/2)
RF AMP
DSUM
IC405, IC407 (1/2)
TILT IN, TILT OUT AMP
TIPI
IC403
FOCUS COIL DRIVE
TRACKING COIL DRIVE
FPD
TPD
SLPI
IC402
SLED MOTOR DRIVE
TILT MOTOR DRIVE
SDR1
SDR2
IC407 (1/3)
TILT LIMIT
TIDR
IC406 (1/2)
TILT UP/DOWN CONTROL
TILT UP
TILT DN
IC401
SERVO
·FOCUS SERVO
·TRACKING SERVO
·TILT SERVO
·SLED SERVO
SET DT
SET CLK
5V LT
FL
TCNT
ITJ
MTJ
RF (V)
RF (A)
IC203
AFM DEMOD, CX NOISE REDUCTION
A MUTE 1, A MUTE 2, CX
IC201
DIGITAL AUDIO SIGNAL PROCESSOR
PCMD
LRCK
BCK
SED DATA, DSP CK, DSP LT
MDP
IC205
DIGITAL FILTER
VCO
IC206
LINE OUT AMP
IC204
CD SPINDLE ERROR AMP
IC505
CD
LD
IC504
LD SPINDLE ERROR AMP
PC OUT 1
PC OUT 2
PCMD
PCMDI
SQSO
SQCK
IC502
SYSTEM CONTROL
·FRAME NO. DECODER
·SPINDLE CONTROLLER
·REF. V, H GENERATOR
·VIDEO CONTROLLER
·DSP CLOCK CONTROLLER
·DIGITAL AUDIO CONTROLLER
SET DAT
SET CLK
XSET CK
SET DATA, SET CLK
MECH SO, MECH SI, MECH CLK
IC501
SYSTEM CONTROL (μCOM)
·MECH. CONTROLLER
SET DT
SET CK
MMI SO, MMI SI, MMI CLK
IC001
FM DEMOD, DROP OUT DET, P CODE SEP, SYNC SEP
P CODE
PB CS
TBC REF H
IC003
DIGITAL TBC, DOC, NOISE CANCEL
SET DATA
SET CLK
V LOAD
IC004
GRAY PICTURE INSERTION
O MUTE
V MUTE1
IC005
VIDEO MUTING
V MUTE2
IC002
CHRACTER GENERATOR, CHARACTER INSERTION
CG SI
CG CLK
CG CS
J203
VIDEO
AUDIO L
AUDIO R
LINE OUT
J202
VIDEO
AUDIO L
AUDIO R
LINE OUT
FP-740 BOARD (See Page 4-35)
IC102
MODE CONTROL
D106
7 SEGMENT X2 LED
D101, 102, 104
D112-114
DISPLAY LED (M PLAY, SIDE A, SIDE B)
MMI SO, MMI SI, MMI CLK, MMI CS
IC103
EEPROM
PH101
DOOR OPEN/CLOSE SENSOR
IC101
VOLTAGE DETECT
RESET
EVER 5V
REG +5V
PW-717 BOARD (See Page 4-36)
IC001
REMOTE CONTROL RECEIVER
SIRCS
S201-209
FUNCTION KEY
AD1
AD2
D201-203
DISPLAY LED (POWER, STAND BY, PLAY)
LED PLAY
P.CONT
P.OFF
IC503
LOADING MOTOR DRIVE
LOAD M+
LOAD M-
LOADING
UN LOADING
IC051, IC052
SPINDLE MOTOR DRIVE
SP ERROR
IC101, IC201-204
POWER SUPPLY (SWITCHING REGULATOR)
MODE CONTROL
EVER +5V
SYSTEM CONTROL
MODE CONTROL
VIDEO, AUDIO, SERVO
REG +5V
REG -5V
AUDIO
REG +12V
REG -12V
SYSTEM CONTROL
UNREG +16V
SPINDLE MOTOR DRIVE
UNREG +16V
UNREG -16V
REG +5V
REG -5V
EVER 5V
AC IN
SW101
VOLTAGE SELECTOR
POWER SUPPLY BLOCK SR-539
09

(We will inform of the printed wiring board, schematic diagram and repair parts list of power supply block in the future.)

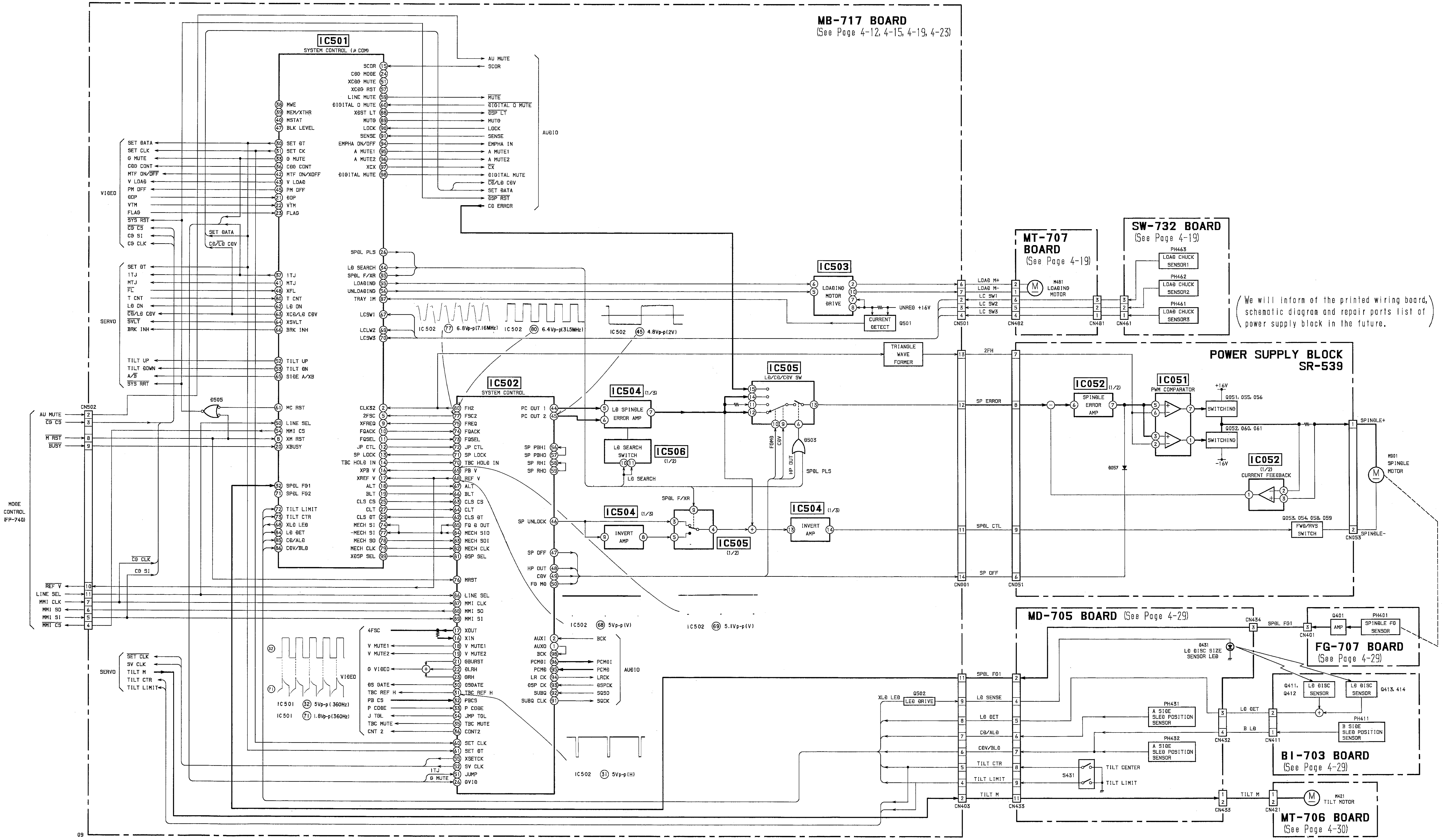
3-2. VIDEO BLOCK DIAGRAM


MB-717 BOARD (See Page 4-12, 4-15, 4-19, 4-23)
OPTICAL BLOCK
IC2
OEIC
A D B C
8
CN1
RF
11
CN402
RF
RF (A), EFM
SERVO BLOCK
Q405
BUFFER
Q001, 003, 004
MTF CORRECT AMP
Q002
MTF SW
MTF ON/OFF
BPF
Q011, 012
D001
LIMITER
IC1 (26) 0.9Vp-p (H)
IC001 (1/2)
FM DEMOD
DROP OUT DETECT
Q009, 014
LPF
DE-EMPHASIS
IC1 (18) 1Vp-p (H)
Q017
LPF
SYNC SEP
CODE SEP
IC1 (30) 1Vp-p (H)
Q007
BUFFER
LPF
Q019, 020
AMP
Q021, 022
SYNC-TIP CLAMP
VRB
PB CS
DOP
IC3 (39) 1.7Vp-p (H)
IC003
DIGITAL TBC, DOC, NC
A/D CONV
TBC
DOC
NC
D/A CONV
PLL
XTAL OSC
VRBS
NDOD
CSYNC
X0
X1
X001 28.125MHz
CT001
CLOCK
IC3 (31) 1.4Vp-p (H)
Q027
LPF
RV001
VIDEO LEVEL
Q024
BUFFER
IC1 (8) 1Vp-p (H)
IC001 (1/2)
NC
FADE
CDG CONT
IC3 (71) 0.7Vp-p (28.125MHz)
IC1 (13) 4.7Vp-p (H)
IC1 (14) 4Vp-p (H)
SET CLK
SET DATA
V LOAD
M CLK
M DATA
M LOAD
CNT2
J TGL
TOGGLE
SYS RST
NRST
VTM
FLAG
TBC REF H
EX REF H
TBCMTE
PMOFF
Q028
BUFFER
RCX1
RCX2
IC3 (2) 7.6Vp-p (14.318MHz)
CDG CONT
SYSTEM CONTROL (IC501)
DOP
MTF ON/OFF
SYS RST
VTM
FLAG
PM OFF
CDG CONT
SET CLK
SET DATA
V LOAD
G MUTE
J203 VIDEO OUT(75Ω terminated) 1Vp-p (H)
D002
GATE
SYSTEM CONTROL (IC502)
P CODE
DS GATE
4FSC
CNT2
J TGL
TBC REF H
TBC MUTE
PB CS
G VIDEO
V MUTE 1
V MUTE 2
IC004
GRAY PICTURE INSERTION
V MUTE1
G MUTE
IC005
MUTING
6dB
V MUTE2
IC2 (10) 1.8Vp-p (H)
Q013, 015
SYNC-TIP CLAMP
VRB (IC003 (41))
Q030, 016
SYNC SEP, CLAMP
IC002
CHARACTER GENERATOR/ CHARACTER INSERTION
V IN
V OUT
C SYNC
4FSC
4FSC
CS
CLK
SI
IC2 (8) 1.8Vp-p (H)
Q023
BUFFER
Q026
BUFFER
Q025
BUFFER
J203 (1/2)
VIDEO OUT1
J202 (1/2)
VIDEO OUT2
IC2 (18) 4.8Vp-p (H)
SYSTEM CONTROL (CN502)
CG CS
CG CLK
CG SI
09

3-3. SERVO BLOCK DIAGRAM

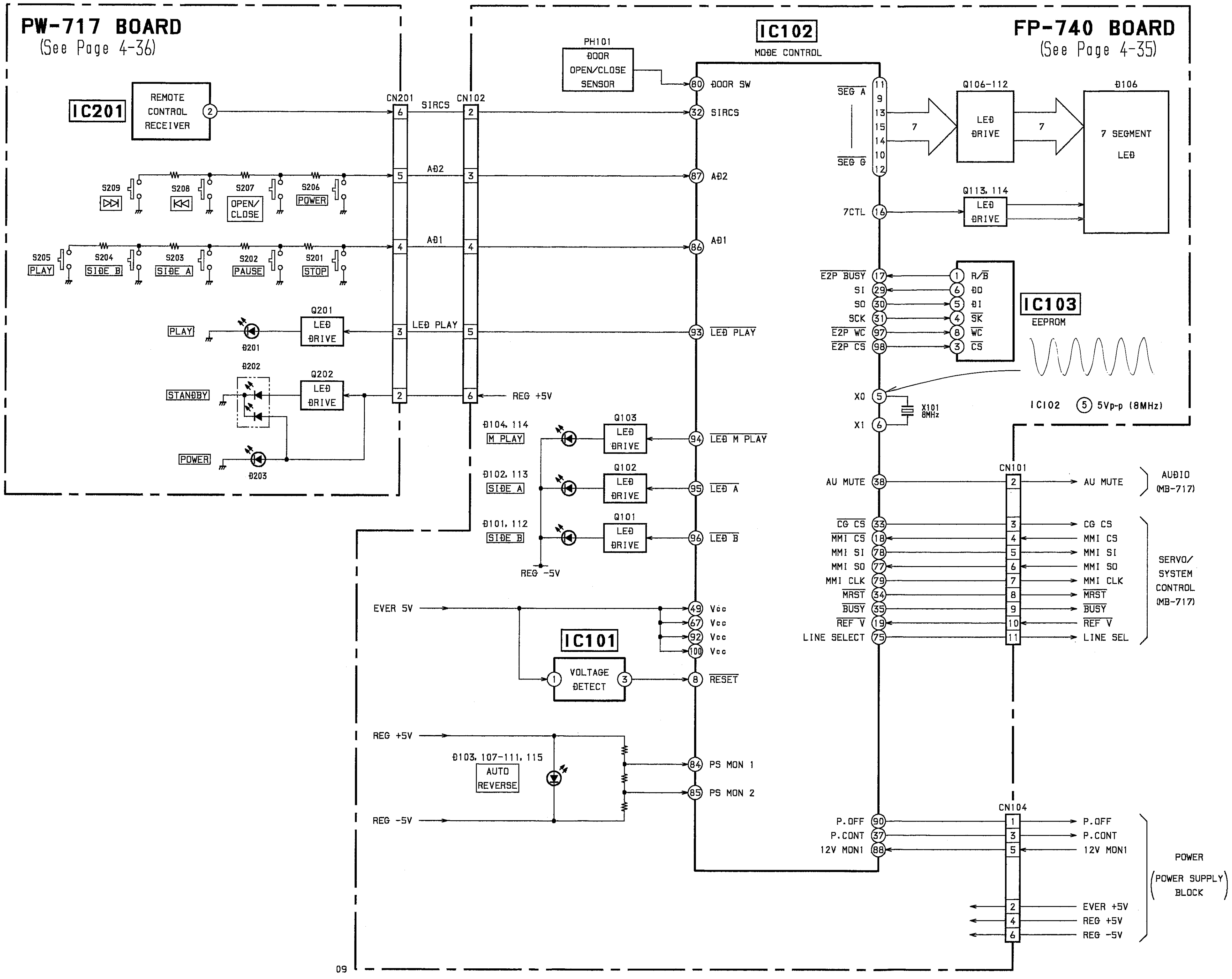

MB-717 BOARD
(See Page 4-12, 4-15, 4-19, 4-23)
OPTICAL BLOCK
IC1
IC2
OEIC
VR1
VR2
VR3
VR4
VR5
VR6
VR7
TP1
LASER DIODE
Q1
LD DRIVE
FEO
FE
E
-F
TEO
TE
RF
LDC
LD
PD
FEB
CN1
CN401
FOR CHECK
TRK OPEN
RF
EFM
SLED-
SLED OUT
4F
FOCUS ERR (Y)
FOCUS ERR (X)
TRK ERR (Y)
TRK ERR (X)
CN402
Q405
BUFFER
Q406, 407
AMP
Q408
AMP
HPF
LPF
1.7MHZ
Q409-411
AMP
Q413
LD EFM MUTE
IC407 (1/3)
CD
LD
CD/LD CDV
RF (V)
VIDEO
RF (A)
EFM
AUDIO
IC404 (1/2)
RF AMP
IC406 (1/2)
FOCUS ERROR AMP
IC401 (1/3)
FOCUS SERVO
UPDN
FPD
FCD
FLD
CD PHASE COMPENSATION ELEMENT
LD PHASE COMPENSATION ELEMENT
Q416
+5V
Q414
A/B
IC403 (1/2)
FOCUS COIL DRIVE
Q415
PROTECT DET
Q403, 404
FOCUS COIL DRIVE
FOCUS M
FOCUS RTN
+16V
-16V
IC401 (1/3)
TRACKING SERVO
MTJ
ST
TGR
TGS
TPD
TCD
TLD
TRK OPEN
IC403 (1/2)
TRACKING COIL DRIVE
Q401, 402
TRACKING COIL DRIVE
TRK M
SET DT
ITJ
MTJ
FL
TCNT
LD ON
CD/LD CDV
SVLT
BRK INH
TILT UP
TILT DOWN
A/B
SYS RST
SYSTEM CONTROL (IC501)
IC401 (1/3)
SLED/TILT SERVO
SLPI
SLPO
SDR1
SDR2
PHASE COMPENSATION
TIPI
TIPO
TIDR
DSUM
DAC
500K CLK
S CLK
S DATA
LATCH
RST
JUMP
FL
TCNT
SV CLK
SET CLK
SET DT
SVLT
SYS RST
ITJ
FL
Q412
TRACKING BRAKE CONTROL
BRK INH
IC402 (1/2)
SLED MOTOR DRIVE
SLED M
SLED-
SLED OUT
IC407 (1/3)
Q403, 404, Q417, 418
TILT LIMIT CONTROL
TILT CTR
TILT LIMIT
IC402 (1/2)
TILT MOTOR DRIVE
TILT M
IC406 (1/2)
TILT UP/DOWN CONTROL AMP
TILT DOWN
TILT UP
TILT SENSOR
LED
PD1
PD2
TILT IN
TILT OUT
IC405
TILT IN AMP
TILT OUT AMP
RV401
A-TILT
RV402
B-TILT
IC407 (1/3)
FOCUS COIL
TRACKING COIL
M902
SLED MOTOR
FOCUS M
FOCUS RTN
TRK M
UNREG GND
SLED M
UNREG GND
SV CLK
SET CLK
SYSTEM CONTROL (IC502)
TILT M
TILT CTR
TILT LIMIT
SYSTEM CONTROL (CN403)
09

3-4. SYSTEM CONTROL BLOCK DIAGRAM

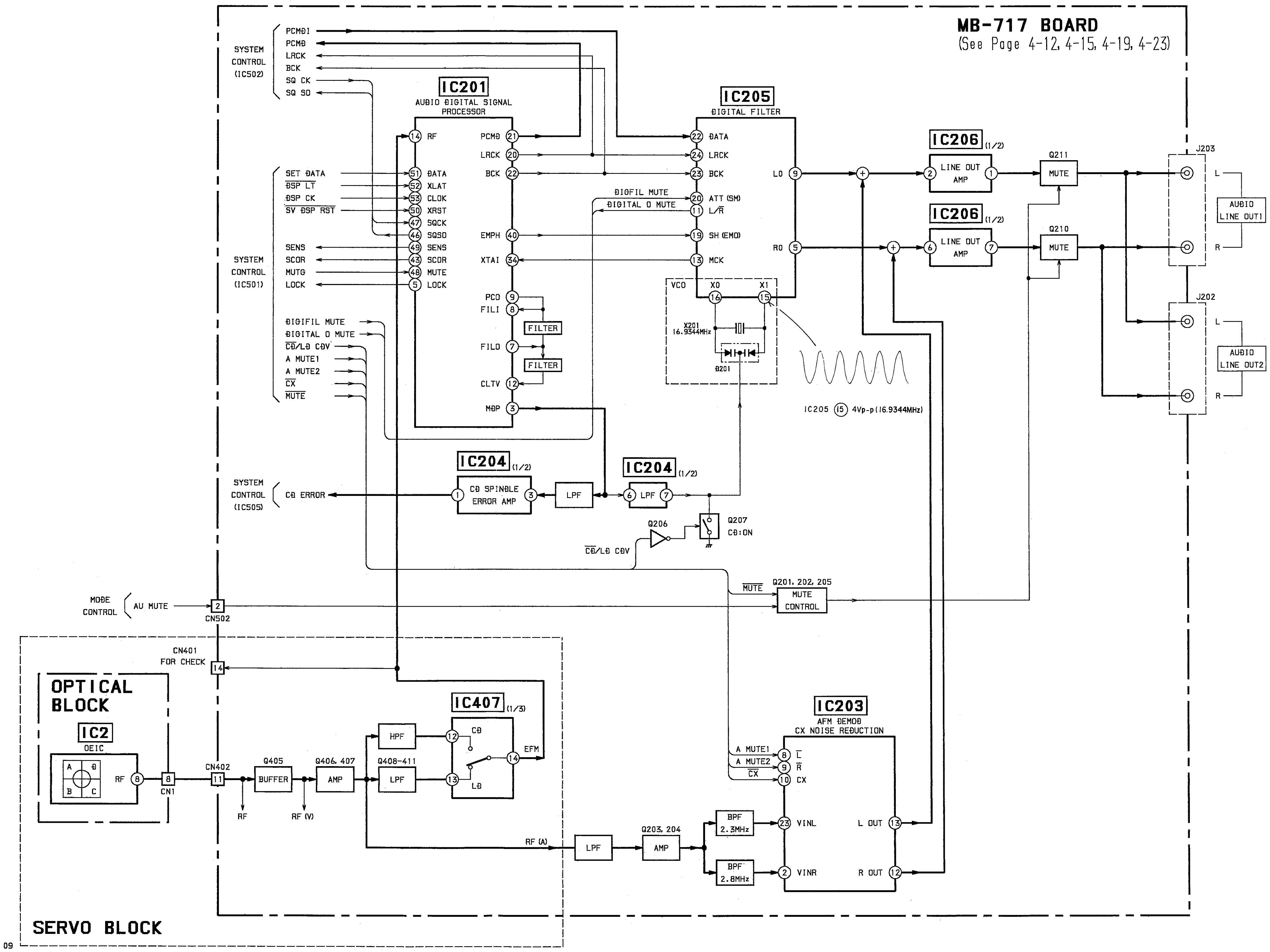

MB-717 BOARD
(See Page 4-12, 4-15, 4-19, 4-23)
IC501
SYSTEM CONTROL (μ COM)
IC502
SYSTEM CONTROL
IC503
LOADING MOTOR DRIVE
CURRENT DETECT
IC504 (1/3)
LD SPINDLE ERROR AMP
IC506 (1/2)
LD SEARCH SWITCH
IC504 (1/3)
INVERT AMP
IC505 (1/2)
IC505
LD/CD/CDV SW
IC504 (1/3)
INVERT AMP
TRIANGLE WAVE FORMER
MT-707 BOARD
(See Page 4-19)
M481 LOADING MOTOR
SW-732 BOARD
(See Page 4-19)
PH463 LOAD CHUCK SENSOR1
PH462 LOAD CHUCK SENSOR2
PH461 LOAD CHUCK SENSOR3
POWER SUPPLY BLOCK
SR-539
IC052 (1/2)
SPINDLE ERROR AMP
IC051
PWM COMPARATOR
SWITCHING
IC052 (1/2)
CURRENT FEEDBACK
FWD/RVS SWITCH
M901 SPINDLE MOTOR
MD-705 BOARD (See Page 4-29)
D431 LD DISC SIZE SENSOR LED
PH431 A SIDE SLED POSITION SENSOR
PH432 A SIDE SLED POSITION SENSOR
S431 TILT CENTER TILT LIMIT
FG-707 BOARD
(See Page 4-29)
Q401 AMP
PH401 SPINDLE FG SENSOR
BI-703 BOARD
(See Page 4-29)
Q411, Q412 LD DISC SENSOR
LD DISC SENSOR Q413, 414
PH411 B SIDE SLED POSITION SENSOR
MT-706 BOARD
(See Page 4-30)
M421 TILT MOTOR
MODE CONTROL (FP-740)
VIDEO
SERVO
AUDIO
IC502 (77) 6.8Vp-p(7.16MHz)
IC502 (80) 6.4Vp-p(3.58MHz)
IC502 (45) 4.8Vp-p(2V)
IC502 (68) 5Vp-p(V)
IC502 (69) 5.1Vp-p(V)
IC502 (31) 5Vp-p(H)
IC501 (32) 5Vp-p(360Hz)
IC501 (71) 1.8Vp-p(360Hz)
CN502
CN501
CN482
CN481
CN461
CN001
CN051
CN053
CN403
CN433
CN434
CN401
CN432
CN411
CN421

(We will inform of the printed wiring board, schematic diagram and repair parts list of power supply block in the future.)

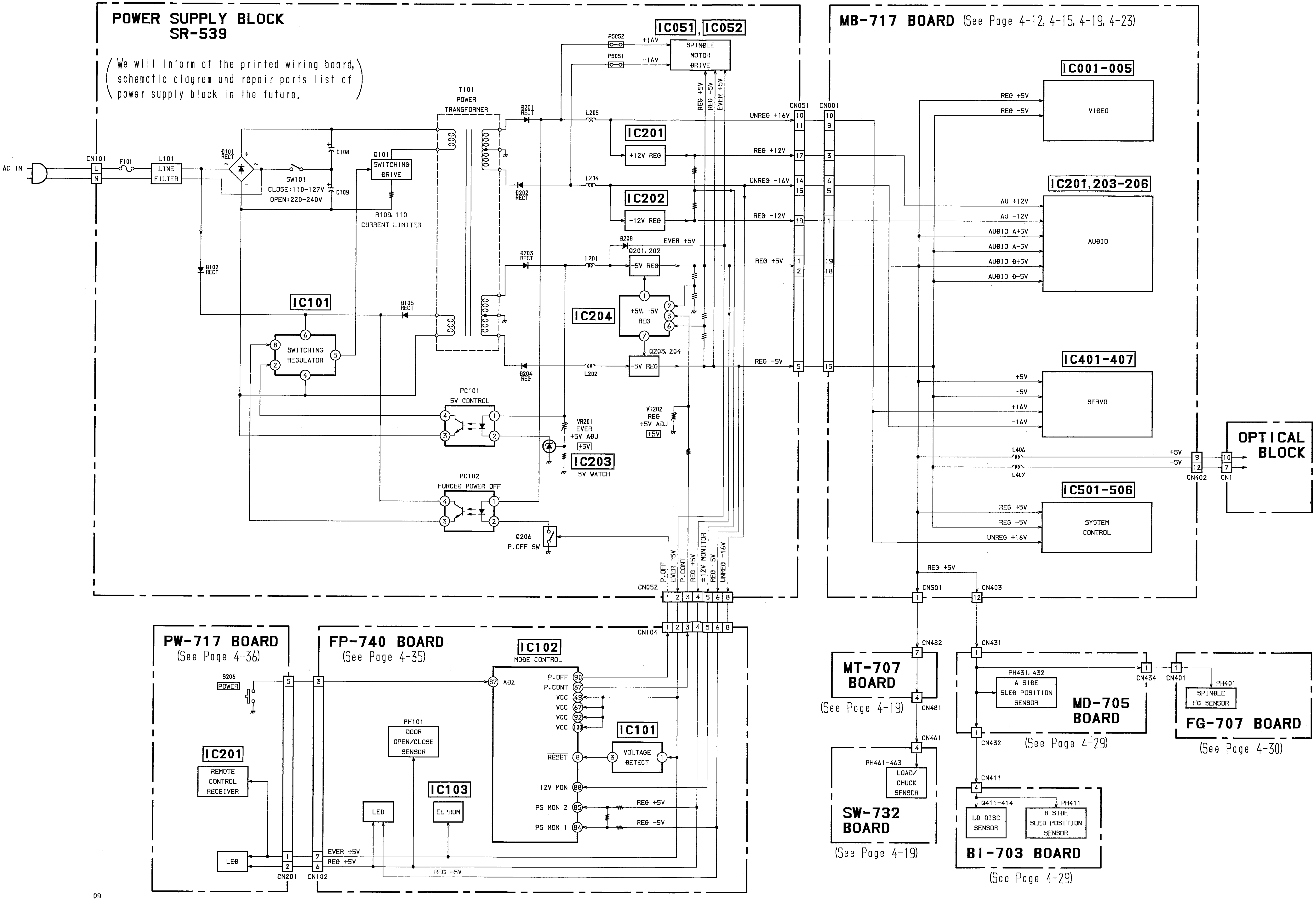
3-5. MODE CONTROL BLOCK DIAGRAM


PW-717 BOARD
(See Page 4-36)
IC201
REMOTE CONTROL RECEIVER
S209
S208
S207 OPEN/CLOSE
S206 POWER
S205 PLAY
S204 SIDE B
S203 SIDE A
S202 PAUSE
S201 STOP
PLAY
D201
Q201 LED DRIVE
STANDBY
D202
Q202 LED DRIVE
POWER
D203
CN201
CN102
SIRCS
AD2
AD1
LED PLAY
REG +5V
FP-740 BOARD
(See Page 4-35)
PH101 DOOR OPEN/CLOSE SENSOR
IC102
MODE CONTROL
DOOR SW
SIRCS
AD2
AD1
LED PLAY
LED M PLAY
LED A
LED B
Vcc
RESET
PS MON 1
PS MON 2
SEG A
SEG G
7CTL
E2P BUSY
SI
SO
SCK
E2P WC
E2P CS
X0
X1
X101 8MHz
AU MUTE
CG CS
MMI CS
MMI SI
MMI SO
MMI CLK
MRST
BUSY
REF V
LINE SELECT
P.OFF
P.CONT
12V MONI
Q106-112 LED DRIVE
D106 7 SEGMENT LED
Q113, 114 LED DRIVE
IC103 EEPROM
R/B
DO
DI
SK
WC
CS
IC102 (5) 5Vp-p (8MHz)
D104, 114 M PLAY
Q103 LED DRIVE
D102, 113 SIDE A
Q102 LED DRIVE
D101, 112 SIDE B
Q101 LED DRIVE
REG -5V
EVER 5V
IC101 VOLTAGE DETECT
REG +5V
D103, 107-111, 115 AUTO REVERSE
REG -5V
CN101
AU MUTE
AUDIO (MB-717)
CG CS
MMI CS
MMI SI
MMI SO
MMI CLK
MRST
BUSY
REF V
LINE SEL
SERVO/SYSTEM CONTROL (MB-717)
CN104
P.OFF
P.CONT
12V MONI
EVER +5V
REG +5V
REG -5V
POWER (POWER SUPPLY BLOCK)
09

3-6. AUDIO BLOCK DIAGRAM


MB-717 BOARD
(See Page 4-12, 4-15, 4-19, 4-23)
SYSTEM CONTROL (IC502)
PCMDI
PCMD
LRCK
BCK
SQ CK
SQ SO
IC201
AUDIO DIGITAL SIGNAL PROCESSOR
RF
PCMD
LRCK
BCK
SET DATA
DSP LT
DSP CK
SV DSP RST
DATA
XLAT
CLOK
XRST
SQCK
SQSO
EMPH
SENS
SCOR
MUTG
LOCK
XTAI
SYSTEM CONTROL (IC501)
MUTE
PCO
FILI
FILTER
FILO
FILTER
CLTV
MDP
DIGIFIL MUTE
DIGITAL 0 MUTE
CD/LD CDV
A MUTE1
A MUTE2
CX
MUTE
IC205
DIGITAL FILTER
DATA
LRCK
BCK
ATT (SM)
L/R
SH (EMD)
MCK
LO
RO
VCO
X0
X1
X201 16.9344MHz
D201
IC205 (15) 4Vp-p (16.9344MHz)
IC206 (1/2)
LINE OUT AMP
Q211
MUTE
Q210
MUTE
J203
L
R
AUDIO LINE OUT1
J202
AUDIO LINE OUT2
IC204 (1/2)
CD SPINDLE ERROR AMP
LPF
SYSTEM CONTROL (IC505)
CD ERROR
Q206
Q207 CD:ON
CD/LD CDV
MUTE
Q201, 202, 205
MUTE CONTROL
MODE CONTROL
AU MUTE
CN502
CN401 FOR CHECK
OPTICAL BLOCK
IC2
OEIC
A
D
B
C
RF
CN1
CN402
Q405
BUFFER
Q406, 407
AMP
Q408-411
HPF
LPF
RF
RF (V)
IC407 (1/3)
CD
LD
EFM
RF (A)
LPF
Q203, 204
AMP
BPF 2.3MHz
BPF 2.8MHz
IC203
AFM DEMOD
CX NOISE REDUCTION
A MUTE1
A MUTE2
CX
L
R
CX
VINL
VINR
L OUT
R OUT
SERVO BLOCK
09

3-7. POWER SUPPLY BLOCK DIAGRAM

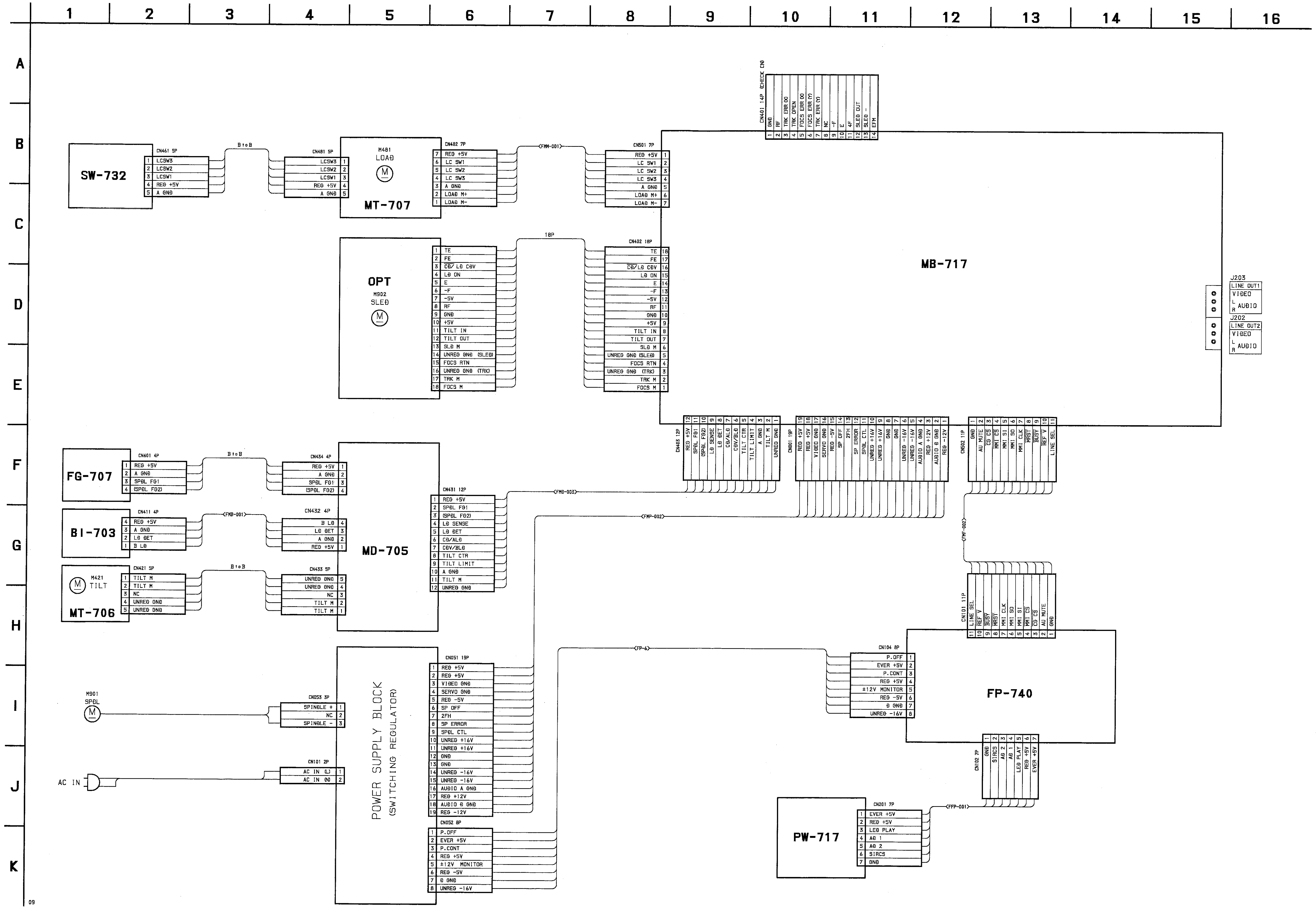


(We will inform of the printed wiring board, schematic diagram and repair parts list of power supply block in the future.)

POWER SUPPLY BLOCK
SR-539
AC IN
CN101
L
N
F101
L101
LINE FILTER
D101 RECT
SW101
CLOSE:110-127V
OPEN:220-240V
C108
C109
Q101
SWITCHING DRIVE
R109, 110
CURRENT LIMITER
T101
POWER TRANSFORMER
D102 RECT
D105 RECT
IC101
SWITCHING REGULATOR
PC101
5V CONTROL
PC102
FORCED POWER OFF
Q206
P.OFF SW
VR201
EVER +5V ADJ
+5V
IC203
5V WATCH
D201 RECT
D202 RECT
D203 RECT
D204 REG
D208
L205
L204
L201
L202
IC051, IC052
PS052
PS051
+16V
-16V
SPINDLE MOTOR DRIVE
REG +5V
REG -5V
EVER +5V
IC201
+12V REG
IC202
-12V REG
Q201, 202
-5V REG
IC204
+5V, -5V REG
Q203, 204
-5V REG
VR202
REG +5V ADJ
+5V
UNREG +16V
REG +12V
UNREG -16V
REG -12V
REG +5V
REG -5V
CN051
CN001
P.OFF
EVER +5V
P.CONT
REG +5V
±12V MONITOR
REG -5V
UNREG -16V
CN052
CN104
MB-717 BOARD (See Page 4-12, 4-15, 4-19, 4-23)
IC001-005
VIDEO
IC201, 203-206
AU +12V
AU -12V
AUDIO A+5V
AUDIO A-5V
AUDIO D+5V
AUDIO D-5V
AUDIO
IC401-407
+5V
-5V
+16V
-16V
SERVO
L406
L407
CN402
CN1
OPTICAL BLOCK
IC501-506
REG +5V
REG -5V
UNREG +16V
SYSTEM CONTROL
CN501
CN403
CN482
CN481
MT-707 BOARD
(See Page 4-19)
CN461
PH461-463
LOAD/CHUCK SENSOR
SW-732 BOARD
(See Page 4-19)
CN431
PH431, 432
A SIDE SLED POSITION SENSOR
MD-705 BOARD
CN432
(See Page 4-29)
CN434
CN401
PH401
SPINDLE FG SENSOR
FG-707 BOARD
(See Page 4-30)
CN411
Q411-414
PH411
LD DISC SENSOR
B SIDE SLED POSITION SENSOR
BI-703 BOARD
(See Page 4-29)
PW-717 BOARD
(See Page 4-36)
S206
POWER
IC201
REMOTE CONTROL RECEIVER
LED
CN201
FP-740 BOARD
(See Page 4-35)
CN102
EVER +5V
REG +5V
REG -5V
PH101
DOOR OPEN/CLOSE SENSOR
LED
IC103
EEPROM
IC102
MODE CONTROL
AD2
P.OFF
P.CONT
VCC
RESET
12V MON
PS MON 2
PS MON 1
IC101
VOLTAGE DETECT
REG +5V
REG -5V

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
K
SW-732
CN461 5P
1 LCSW3
2 LCSW2
3 LCSW1
4 REG +5V
5 A GND
B to B
CN481 5P
LCSW3 1
LCSW2 2
LCSW1 3
REG +5V 4
A GND 5
M481
LOAD
M
MT-707
CN482 7P
7 REG +5V
6 LC SW1
5 LC SW2
4 LC SW3
3 A GND
2 LOAD M+
1 LOAD M-
<FMM-001>
CN501 7P
REG +5V 1
LC SW1 2
LC SW2 3
LC SW3 4
A GND 5
LOAD M+ 6
LOAD M- 7
OPT
M902
SLED
M
1 TE
2 FE
3 CD/ LD CDV
4 LD ON
5 E
6 -F
7 -5V
8 RF
9 GND
10 +5V
11 TILT IN
12 TILT OUT
13 SLD M
14 UNREG GND (SLED)
15 FOCS RTN
16 UNREG GND (TRK)
17 TRK M
18 FOCS M
18P
CN402 18P
TE 18
FE 17
CD/LD CDV 16
LD ON 15
E 14
-F 13
-5V 12
RF 11
GND 10
+5V 9
TILT IN 8
TILT OUT 7
SLD M 6
UNREG GND (SLED) 5
FOCS RTN 4
UNREG GND (TRK) 3
TRK M 2
FOCS M 1
CN401 14P (CHECK CN)
1 GND
2 RF
3 TRK ERR (X)
4 TRK OPEN
5 FOCS ERR (X)
6 FOCS ERR (Y)
7 TRK ERR (Y)
8 NC
9 -F
10 E
11 4F
12 SLED OUT
13 SLED -
14 EFM
MB-717
J203
LINE OUT1
VIDEO
L
R
AUDIO
J202
LINE OUT2
VIDEO
L
R
AUDIO
CN403 12P
12 REG +5V
11 SPDL FG1
10 (SPDL FG2)
9 LD SENSE
8 LD DET
7 CD/ALD
6 CDV/BLD
5 TILT CTR
4 TILT LIMIT
3 A GND
2 TILT M
1 UNREG GND
CN001 19P
19 REG +5V
18 REG +5V
17 VIDEO GND
16 SERVO GND
15 REG -5V
14 SP OFF
13 2FH
12 SP ERROR
11 SPDL CTL
10 UNREG +16V
9 UNREG +16V
8 GND
7 GND
6 UNREG -16V
5 UNREG -16V
4 AUDIO A GND
3 REG +12V
2 AUDIO D GND
1 REG -12V
CN502 11P
1 GND
2 AU MUTE
3 CG CS
4 MMI CS
5 MMI SI
6 MMI SO
7 MMI CLK
8 MRST
9 BUSY
10 REF V
11 LINE SEL
FG-707
CN401 4P
1 REG +5V
2 A GND
3 SPDL FG1
4 (SPDL FG2)
B to B
CN434 4P
REG +5V 1
A GND 2
SPDL FG1 3
(SPDL FG2) 4
BI-703
CN411 4P
4 REG +5V
3 A GND
2 LD DET
1 B LD
<FMB-001>
CN432 4P
B LD 4
LD DET 3
A GND 2
REG +5V 1
M421
TILT
M
MT-706
CN421 5P
1 TILT M
2 TILT M
3 NC
4 UNREG GND
5 UNREG GND
B to B
CN433 5P
UNREG GND 5
UNREG GND 4
NC 3
TILT M 2
TILT M 1
MD-705
CN431 12P
1 REG +5V
2 SPDL FG1
3 (SPDL FG2)
4 LD SENSE
5 LD DET
6 CD/ALD
7 CDV/BLD
8 TILT CTR
9 TILT LIMIT
10 A GND
11 TILT M
12 UNREG GND
<FMD-003>
<FMP-002>
<FMF-002>
<FP-6>
M901
SPDL
M
CN053 3P
SPINDLE + 1
NC 2
SPINDLE - 3
AC IN
CN101 2P
AC IN (L) 1
AC IN (N) 2
POWER SUPPLY BLOCK
(SWITCHING REGULATOR)
CN051 19P
1 REG +5V
2 REG +5V
3 VIDEO GND
4 SERVO GND
5 REG -5V
6 SP OFF
7 2FH
8 SP ERROR
9 SPDL CTL
10 UNREG +16V
11 UNREG +16V
12 GND
13 GND
14 UNREG -16V
15 UNREG -16V
16 AUDIO A GND
17 REG +12V
18 AUDIO D GND
19 REG -12V
CN052 8P
1 P.OFF
2 EVER +5V
3 P.CONT
4 REG +5V
5 ±12V MONITOR
6 REG -5V
7 D GND
8 UNREG -16V
CN101 11P
11 LINE SEL
10 REF V
9 BUSY
8 MRST
7 MMI CLK
6 MMI SO
5 MMI SI
4 MMI CS
3 CG CS
2 AU MUTE
1 GND
CN104 8P
P.OFF 1
EVER +5V 2
P.CONT 3
REG +5V 4
±12V MONITOR 5
REG -5V 6
D GND 7
UNREG -16V 8
FP-740
CN102 7P
1 GND
2 SIRCS
3 AD 2
4 AD 1
5 LED PLAY
6 REG +5V
7 EVER +5V
<FFP-001>
PW-717
CN201 7P
1 EVER +5V
2 REG +5V
3 LED PLAY
4 AD 1
5 AD 2
6 SIRCS
7 GND
09

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For printed wiring boards.**
- ○— : indicated a lead wire mounted on the component side.
- ○ : Through hole.
- ▨ : Pattern from the side which enables seeing.
- Circled numbers refer to waveforms.

- **For schematic diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/4W unless otherwise noted.
  Chip resistor are 1/10W unless otherwise noted.
  kΩ : 1000Ω , MΩ : 1000kΩ .
- All capacitors are in µF unless otherwise noted. pF: µµF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- -⩘- : fusible resistor.
- ▭ : panel designation.
- ▭ : adjustment for repair. *
- ━━ : B+ Line. *
- - - - : B– Line. *
- ⇨ : IN/OUT direction of (+, –) B LINE. *
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points. *
- Readings are taken under pause mode.
  (NTSC REF DISC HLV-8 SIDE 1 FRAME No. 4100)
- Readings are taken with a digital multimeter (DC10MΩ). *
- Voltage variations may be noted due to normal production tolerances. *

Note: The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

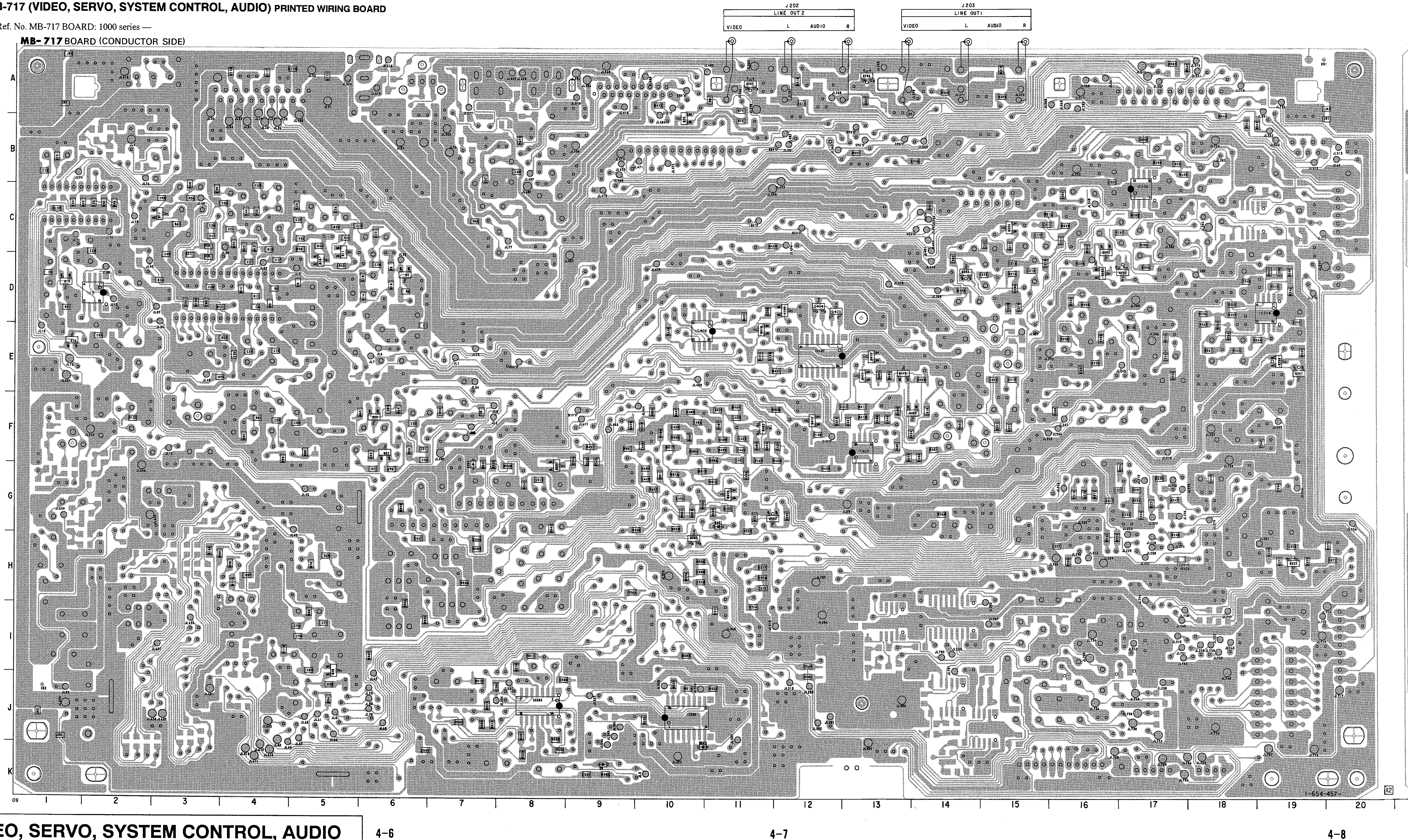
When indicating parts by reference number, please include the board name.

*: indicated by the color red.

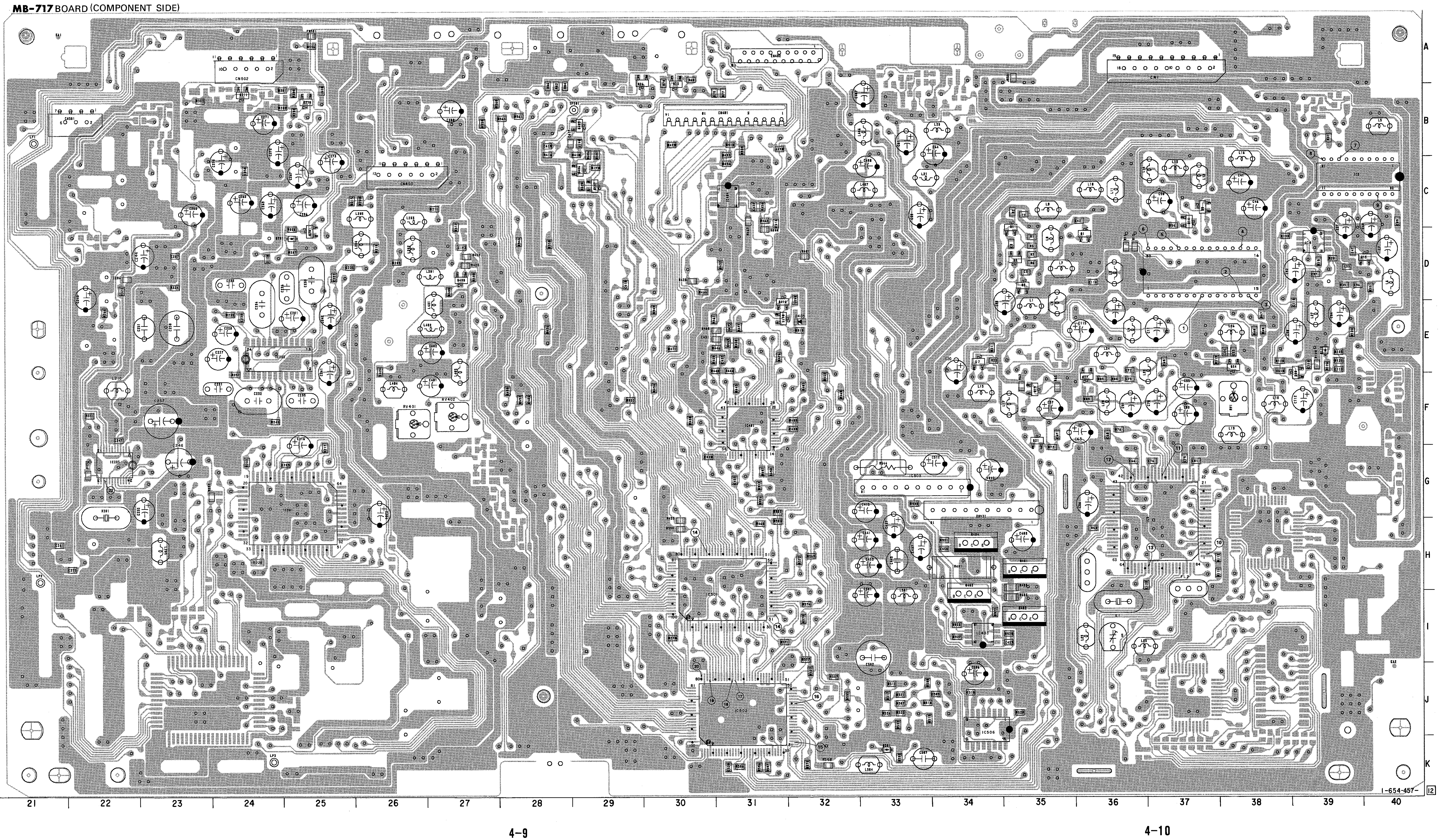
MB-717 (VIDEO, SERVO, SYSTEM CONTROL, AUDIO) PRINTED WIRING BOARD

— Ref. No. MB-717 BOARD: 1000 series —

MB-717 BOARD (CONDUCTOR SIDE)

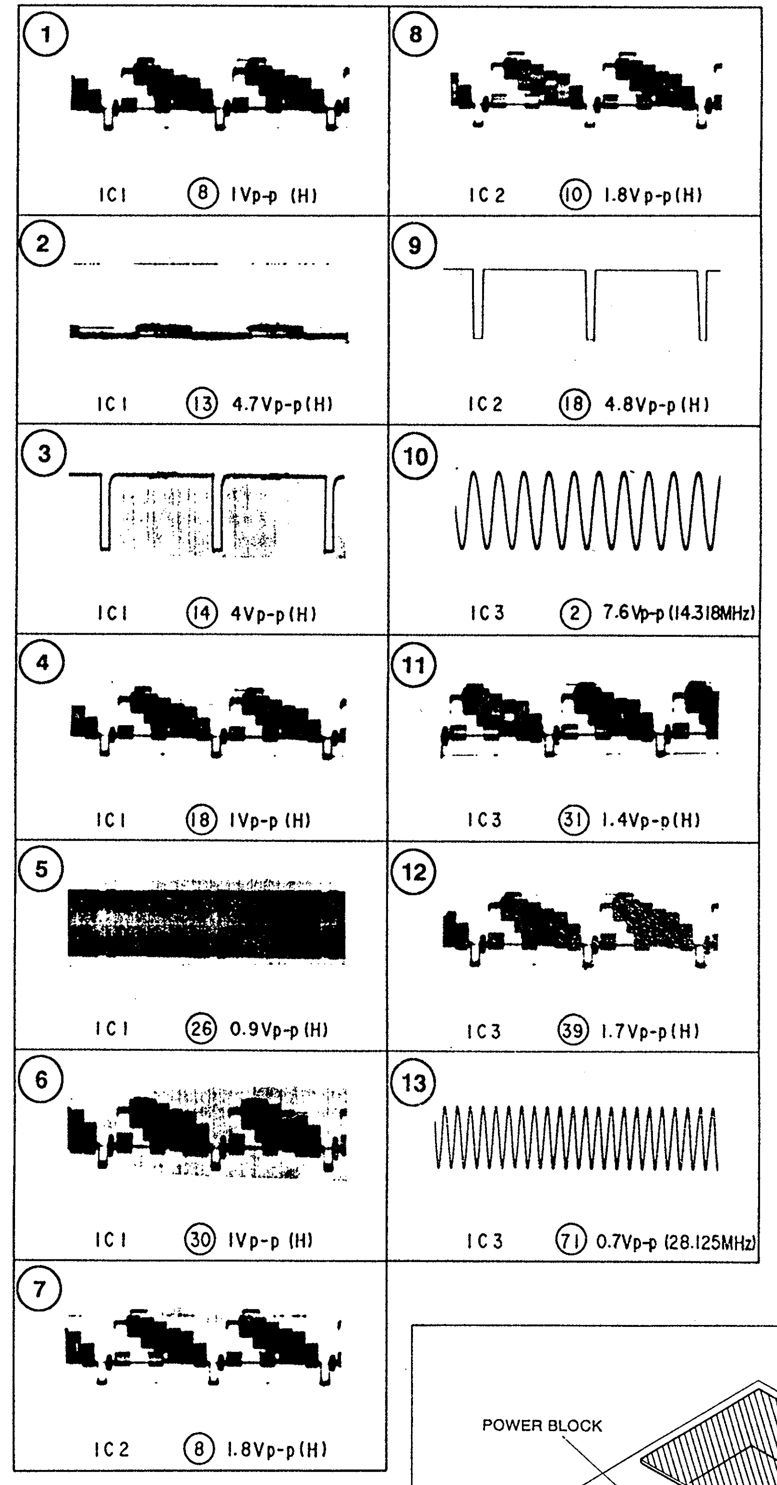

J202
LINE OUT2
VIDEO
L
AUDIO
R
J203
LINE OUT1
VIDEO
L
AUDIO
R
A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
1-654-457-

MB-717 BOARD (COMPONENT SIDE)

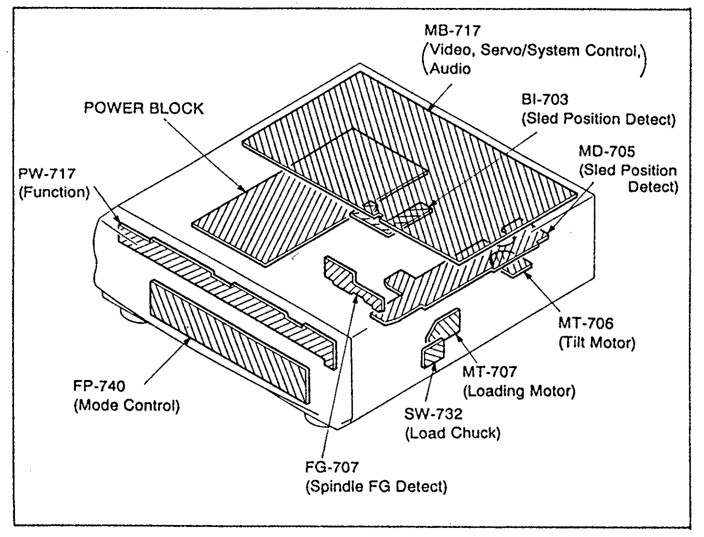

A
B
C
D
E
F
G
H
I
J
K
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
1-654-457-

MB-717BOARD(1/4)

no mark : PAUSE mode.
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)

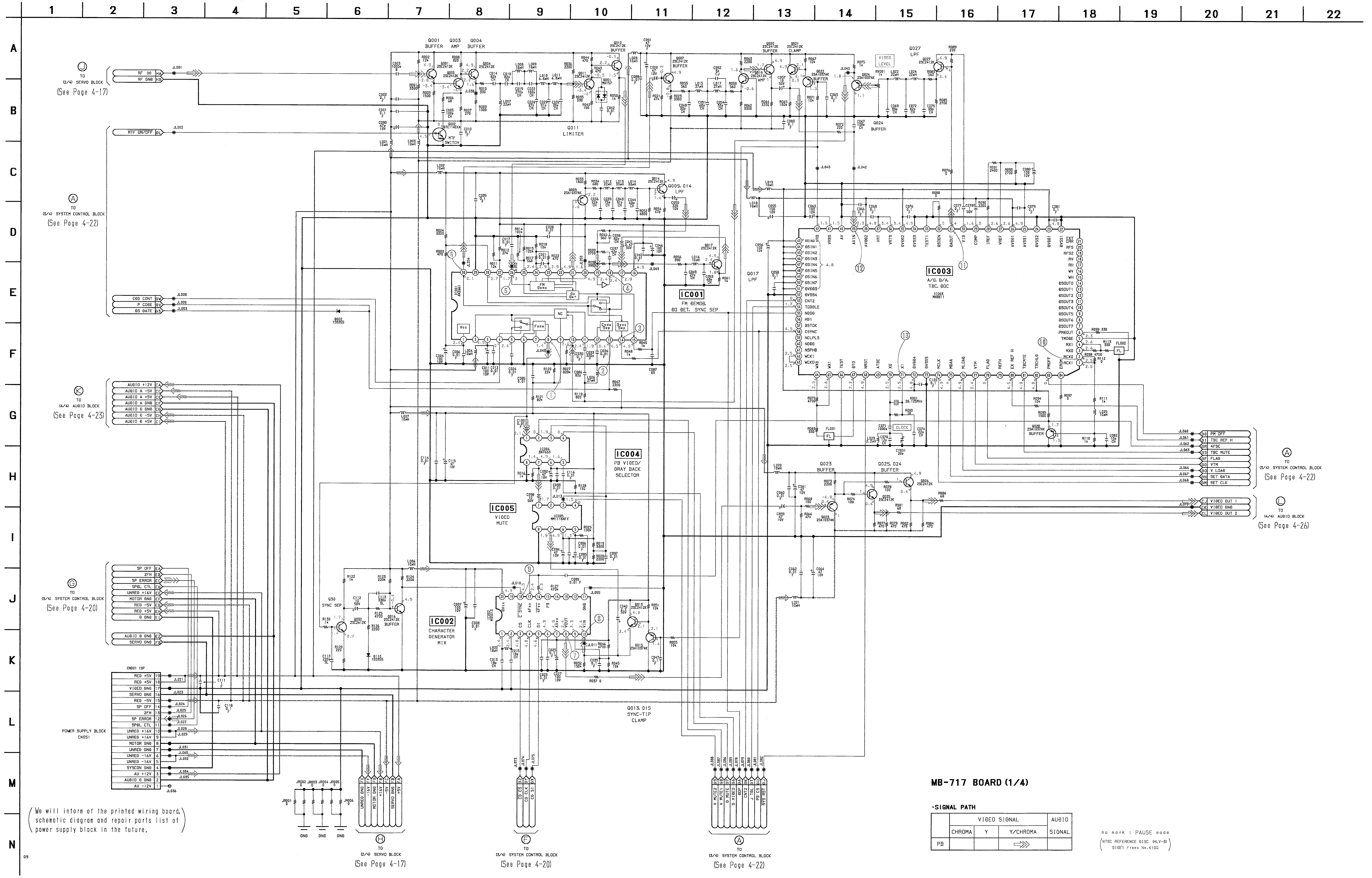


MB-717	BOARD
CN001	A-37
CN401	B-31
CN402	A-31
CN403	C-26
CN501	B-22
CN502	A-24
D001	D-36
D002	K-9
D110	E-39
D201	D-25
D202	D-17
D203	H-19
D204	A-13
D205	A-11
D401	G-11
D402	F-11
D403	D-12
D404	D-12
D405	E-32
D501	K-33
D503	K-11
D504	F-7
D505	H-10
IC001	D-37
IC002	C-40
IC003	H-37
IC004	D-39
IC005	D-2
IC201	G-25
IC203	E-25
IC204	D-19
IC205	G-22
IC206	C-17
IC401	F-31
IC402	G-34
IC403	I-34
IC404	C-31
IC405	F-13
IC406	E-10
IC407	E-12
IC501	I-31
IC502	J-31
IC503	G-33
IC504	J-8
IC505	J-10
IC506	J-34
Q001	C-35
Q002	D-35
Q003	D-35
Q004	D-6
Q007	E-34
Q009	C-37
Q011	C-5
Q012	D-5
Q013	D-1
Q014	C-37
Q015	D-40
Q016	E-1
Q017	C-3
Q019	F-35
Q020	F-6
Q021	F-35
Q022	F-6
Q023	A-30
Q024	E-38
Q025	B-10
Q026	A-30
Q027	F-36
Q028	I-5
Q030	F-39
Q201	C-25
Q202	C-16
Q203	D-14
Q204	C-15
Q205	D-16
Q206	E-19
Q207	E-19
Q210	B-25
Q211	B-24
Q401	H-35
Q402	I-35
Q403	H-34
Q404	H-34
Q405	B-29
Q406	C-29
Q407	C-29
Q408	D-27
Q409	F-14
Q410	E-13
Q411	E-13
Q412	G-11
Q413	E-13
Q414	F-12
Q415	E-32
Q416	E-32
Q417	D-12
Q418	E-11
Q501	G-8
Q502	G-12


MB-717
(Video, Servo/System Control, Audio)
POWER BLOCK
BI-703
(Sled Position Detect)
MD-705
(Sled Position Detect)
PW-717
(Function)
MT-706
(Tilt Motor)
MT-707
(Loading Motor)
SW-732
(Load Chuck)
FP-740
(Mode Control)
FG-707
(Spindle FG Detect)

MB-717 (VIDEO) SCHEMATIC DIAGRAM

— Ref. No. MB-717 BOARD: 1000 series —


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
A
B
C
D
E
F
G
H
I
J
K
L
M
N
J
TO (2/4) SERVO BLOCK
(See Page 4-17)
RF DO
RF GND
MTF ON/OFF
A
TO (3/4) SYSTEM CONTROL BLOCK
(See Page 4-22)
CGS CONT
P CODE
GS GATE
K
TO (4/4) AUDIO BLOCK
(See Page 4-23)
AUDIO +12V
AUDIO A -5V
AUDIO A +5V
AUDIO A GND
AUDIO D GND
AUDIO D -5V
AUDIO D +5V
G
TO (3/4) SYSTEM CONTROL BLOCK
(See Page 4-20)
SP OFF
2FH
SP ERROR
SPGL CTL
UNREG +16V
MOTOR GND
REG -5V
REG +5V
D GND
AUDIO D GND
SERVO GND
CN001 11P
POWER SUPPLY BLOCK CN051
REG +5V
VIDEO GND
SP OFF
UNREG +16V
UNREG -16V
SYSCON GND
AU +12V
AUDIO D GND
AU -12V
JL036
Q001 BUFFER
Q003 AMP
Q004 BUFFER
Q002 MTF SWITCH
Q011 LIMITER
Q005, 014 LPF
Q027 LPF
Q024 BUFFER
VIDEO LEVEL
IC001
FM DEMOD. DO DET. SYNC SEP
IC002
CHARACTER GENERATOR MIX
IC003
A/D D/A TBC DOC
IC004
PB VIDEO/GRAY BACK SELECTOR
IC005
VIDEO MUTE
Q017 LPF
Q023 BUFFER
Q025, 024 BUFFER
Q026 BUFFER
Q030 SYNC SEP
Q013, 015 SYNC-TIP CLAMP
CLOCK
FM OFF
TBC REF H
4FSC
TBC MUTE
FLAG
VTM
V LOAD
SET DATA
SET CLK
A
TO (3/4) SYSTEM CONTROL BLOCK
(See Page 4-22)
VIDEO OUT 1
VIDEO GND
VIDEO OUT 2
L
TO (4/4) AUDIO BLOCK
(See Page 4-26)
H
TO (2/4) SERVO BLOCK
(See Page 4-17)
F
TO (3/4) SYSTEM CONTROL BLOCK
(See Page 4-20)
A
TO (3/4) SYSTEM CONTROL BLOCK
(See Page 4-22)
GND
09

(We will inform of the printed wiring board, schematic diagram and repair parts list of power supply block in the future.)

MB-717 BOARD (1/4)

·SIGNAL PATH

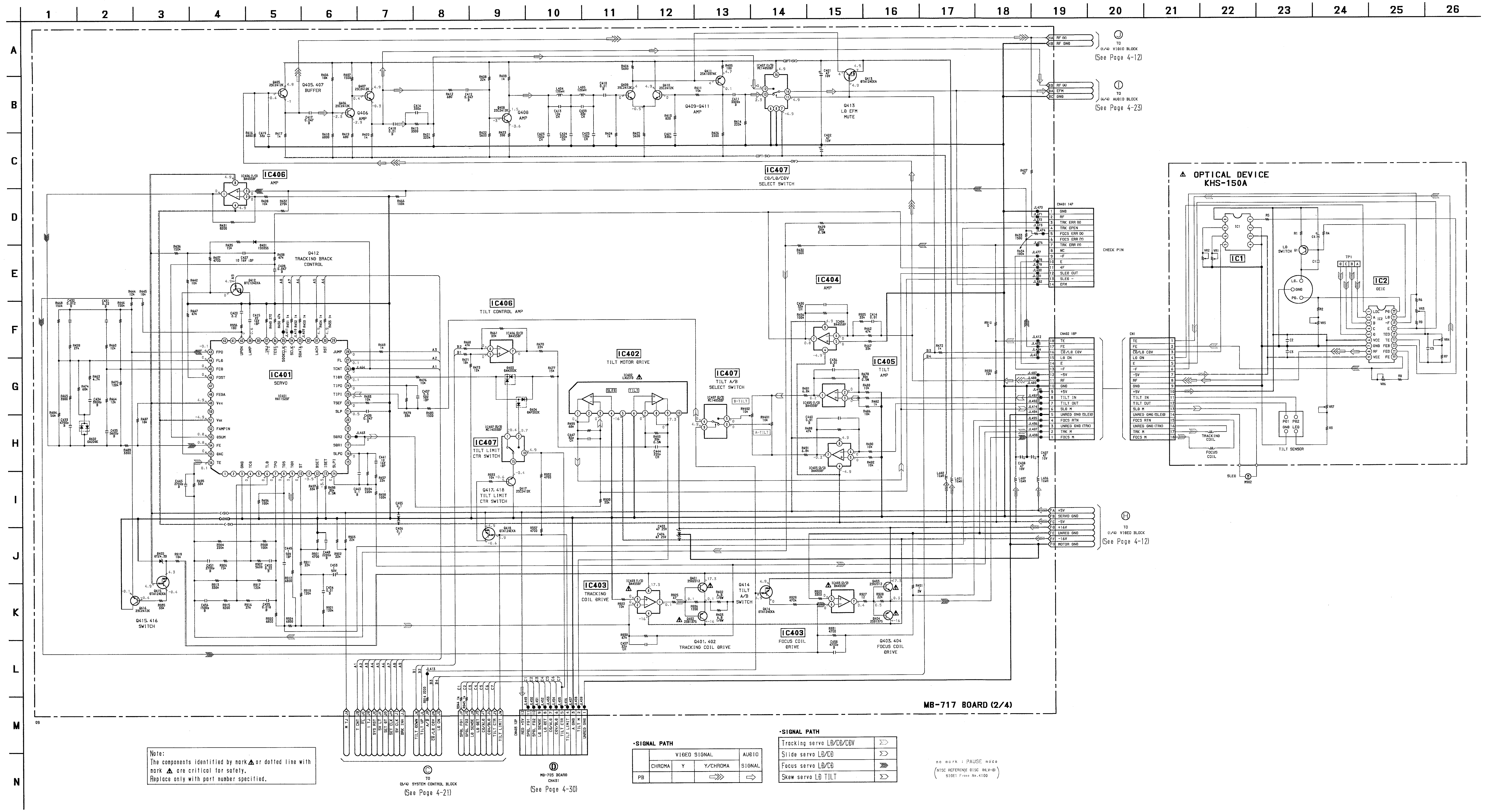
	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
PB			⇨	

no mark : PAUSE mode
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)

MB-717 (SERVO) SCHEMATIC DIAGRAM

— Ref. No. MB-717 BOARD: 1000 series —

- Refer to page 4-6 for printed wiring board of MB-717 BOARD.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
A
B
C
D
E
F
G
H
I
J
K
L
M
N
Q405, 407 BUFFER
Q406 AMP
Q408 AMP
Q409–Q411 AMP
Q413 LD EFM MUTE
IC407 CD/LD/CDV SELECT SWITCH
IC406 AMP
Q412 TRACKING BRACK CONTROL
IC401 SERVO
IC406 TILT CONTROL AMP
IC402 TILT MOTOR DRIVE
IC407 TILT A/B SELECT SWITCH
IC404 AMP
IC405 TILT AMP
IC407 TILT LIMIT CTR SWITCH
Q417, 418 TILT LIMIT CTR SWITCH
Q415, 416 SWITCH
IC403 TRACKING COIL DRIVE
Q401, 402 TRACKING COIL DRIVE
Q414 TILT A/B SWITCH
IC403 FOCUS COIL DRIVE
Q403, 404 FOCUS COIL DRIVE
TO (1/4) VIDEO BLOCK (See Page 4-12)
TO (4/4) AUDIO BLOCK (See Page 4-23)
TO (1/4) VIDEO BLOCK (See Page 4-12)
CHECK PIN
⚠ OPTICAL DEVICE KHS-150A
IC1
IC2 OEIC
LD SWITCH
TILT SENSOR
TRACKING COIL
FOCUS COIL
SLED
M TJ
T CNT
FL
1 TJ
SYS RST
SV LT
SET DT
SET CLK
SV CLK
BRK INH
TILT DOWN
TILT UP
A/B
CD/LD CDV
LD ON
SPDL FG1
SPDL FG2
LD SENSE
LD DET
CD/ALD
CDV/BLD
TILT CTR
TILT LIMIT
CN403 12P
REG +5V
SPDL FG1
SPDL FG2
LD SENSE
LD DET
CD/ALD
CDV/BLD
TILT CTR
TILT LIMIT
A GND
TILT M
UNREG GND
MB-717 BOARD (2/4)

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ⓒ TO (3/4) SYSTEM CONTROL BLOCK (See Page 4-21)

Ⓓ MD-705 BOARD CN431 (See Page 4-30)

·SIGNAL PATH

	VIDEO SIGNAL			AUDIO
	CHROMA	Y	Y/CHROMA	SIGNAL
PB			⇨⋙	⇨

·SIGNAL PATH

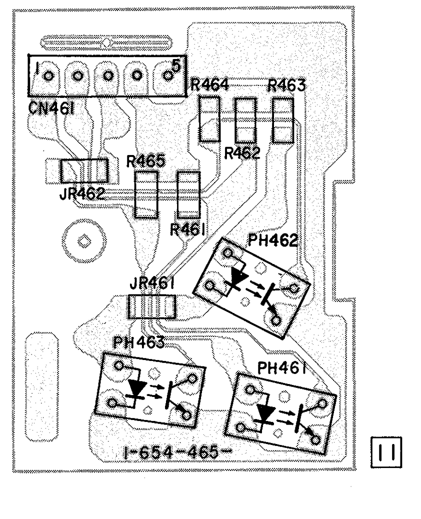
Tracking servo LD/CD/CDV	▷
Slide servo LD/CD	▷
Focus servo LD/CD	▶
Skew servo LD TILT	▷

no mark : PAUSE mode
(NTSC REFERENCE DISC (HLV-8) SIDE1 Frame No.4100)

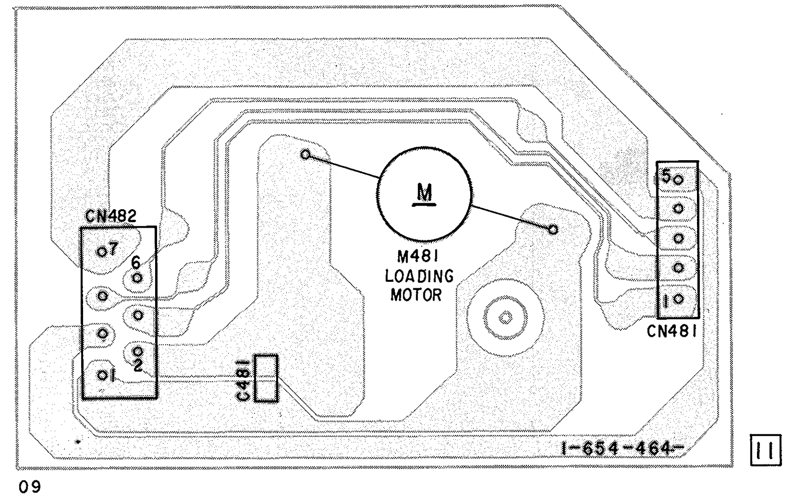
MT-707 (LOADING MOTOR), SW-732 (LOAD CHUCK) PRINTED WIRING BOARDS

— Ref. No. MT-707 and SW-732 BOARDS: 4000 series —

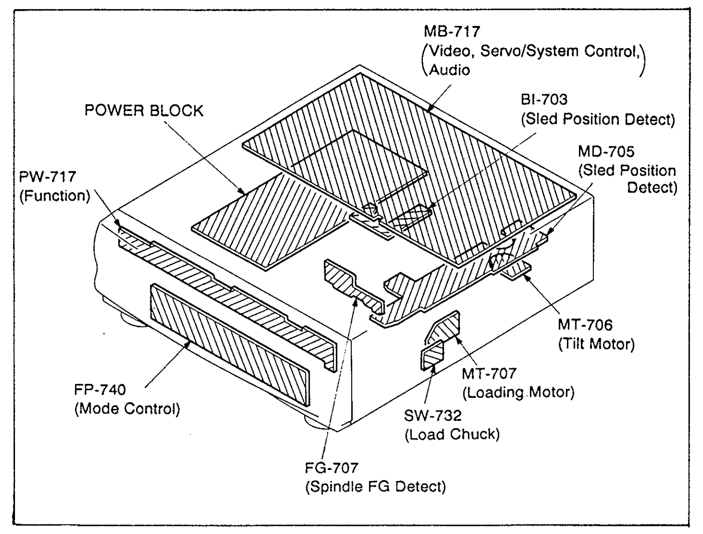
SW-732 BOARD


1
5
CN461
R464
R463
R462
R465
JR462
R461
PH462
JR461
PH463
PH461
1-654-465-
11

MT-707 BOARD


CN482
7
6
2
1
M
M481 LOADING MOTOR
5
1
CN481
C481
1-654-464-
11

09

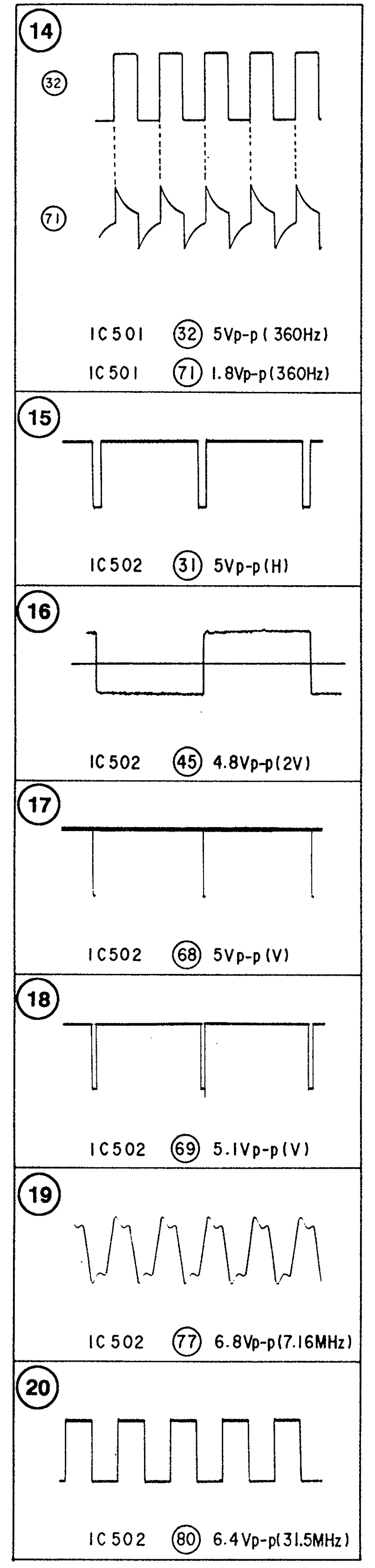

MB-717 (Video, Servo/System Control, Audio)
POWER BLOCK
BI-703 (Sled Position Detect)
MD-705 (Sled Position Detect)
PW-717 (Function)
MT-706 (Tilt Motor)
MT-707 (Loading Motor)
FP-740 (Mode Control)
SW-732 (Load Chuck)
FG-707 (Spindle FG Detect)

MB-717 (SYSTEM CONTROL), MT-707 (LOADING MOTOR), SW-732 (LOAD CHUCK) SCHEMATIC DIAGRAM

— Ref. No. MB-717 BOARD: 1000 series, MT-707 and SW-732 BOARDS: 4000 series —

- Refer to page 4–6 for printed wiring board of MB-717 BOARD.

MB-717 BOARD (3/4)
no mark : PAUSE mode.
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
A
B
C
D
E
F
G
H
I
J
K
L
M
N
IC505
SPINDLE ERROR SIGNAL SELECT (LD/CD/CDV)
IC504
ERROR AMP
IC504
PHASE COMPENSATION
IC506
LD SPDL ERROR AMP
IC504
AMP
IC503
LOADING MOTOR DRIVE
IC502
SYSTEM CONTROL
IC501
SYSTEM CONTROL
SW-732 BOARD
PH461-463
LOAD CHUCK SWITCH
MT-707 BOARD
M481
LOADING MOTOR
Q501
SWITCH
Q502
DISC DET. LED ON/OFF SWITCH
CN461 5P
LCSW3
LCSW2
LCSW1
RED +5V
A GND
CN481 5P
CN482 7P
CN501 7P
REG +5V
LC SW1
LC SW2
LC SW3
A GND
LOAD M+
LOAD M-
CD ERROR
SP OFF
2FH
SP ERROR
SPDL CTL
UNREG +14V
MOTOR GND
REG -5V
REG +5V
D GND
AUDIO G GND
SERVO GND
GND
TEST
PCSEL
BCK
BCKINV
PCMDI
PCMO
LRCK
GSPCK
SUBQ
SUBQ CLK
MMI SI
MMI SO
MMI CLK
LINE SEL
FG 0 OUT
MECH SIO
MECH SOI
MECH CLK
GSP SEL
PBCS
P CODE
JMP TGL
TBC MUTE
CONT2
CDV
CDH
HS
GND
CLV1
CLV2
B/T2
PC OUT1
PC OUT2
SP UNLOCK
SP OFF
HP OUT
CDV
FOMD
SET CKDI
SPDL FG1
D MUTE
LD SEARCH
SPDL F/XR
CDG CONT
ITJ
MWE
MEM/XTHR
MSTAT
MTJ
MTF ON/XOFF
V LOAD
PM OFF
BLK LEVEL
XFL
VCC
LDRSEL
VCC
XDSP SEL
DIDIFIL MUTE
XCK
A MUTE2
A MUTE1
EMPHA ON/OFF
VCC
SENSE
LOCK
MUTO
XOSPLT
TRAYIM
CDV/BLO
CD/ALO
LD DET
GND
DOP
PM OFF
FLAG
VTM
SYS RST
CNT2
MTF ON/OFF
SET CLK
SET DATA
V LOAD
4FSC
TBC MUTE
J TGL
PB CS
P CODE
CDG CONT
TBC REF H
GS GATE
V MUTE2
V MUTE1
G VIDEO
BCK
PCMO I
PCMO
LRCK
DIDIFIL MUTE
CD/LDCDV
SCOR
SQSO
SQCK
MUTO
SENSE
SV GSP RST
SET DATA
GSP LT
GSP CLK
DIGITAL D MUTE
LOCK
A MUTE1
A MUTE2
CK
MUTE
TO (4/4) AUDIO BLOCK (See Page 4-25)
TO (1/4) VIDEO BLOCK (See Page 4-12, 13, 14)
TO (4/4) AUDIO BLOCK (See Page 4-23)
TO (4/4) AUDIO BLOCK (See Page 4-26)
TO (4/4) AUDIO BLOCK (See Page 4-26)
TO (1/4) VIDEO BLOCK (See Page 4-12)
TO (1/4) VIDEO BLOCK (See Page 4-13)
TO (4/4) AUDIO BLOCK (See Page 4-26)
FP-740 BOARD CN101 (See Page 4-35)
TO (3/4) SERVO BLOCK (See Page 4-15)
CN502 11P
AU MUTE
GND
AU MUTE
CD SI
CD SO
CD CLK
MMI SI
MMI SO
MMI CLK
BUSY
RESET
LINE SEL

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

·SIGNAL PATH

Spindle servo (speed and phase)	⋙

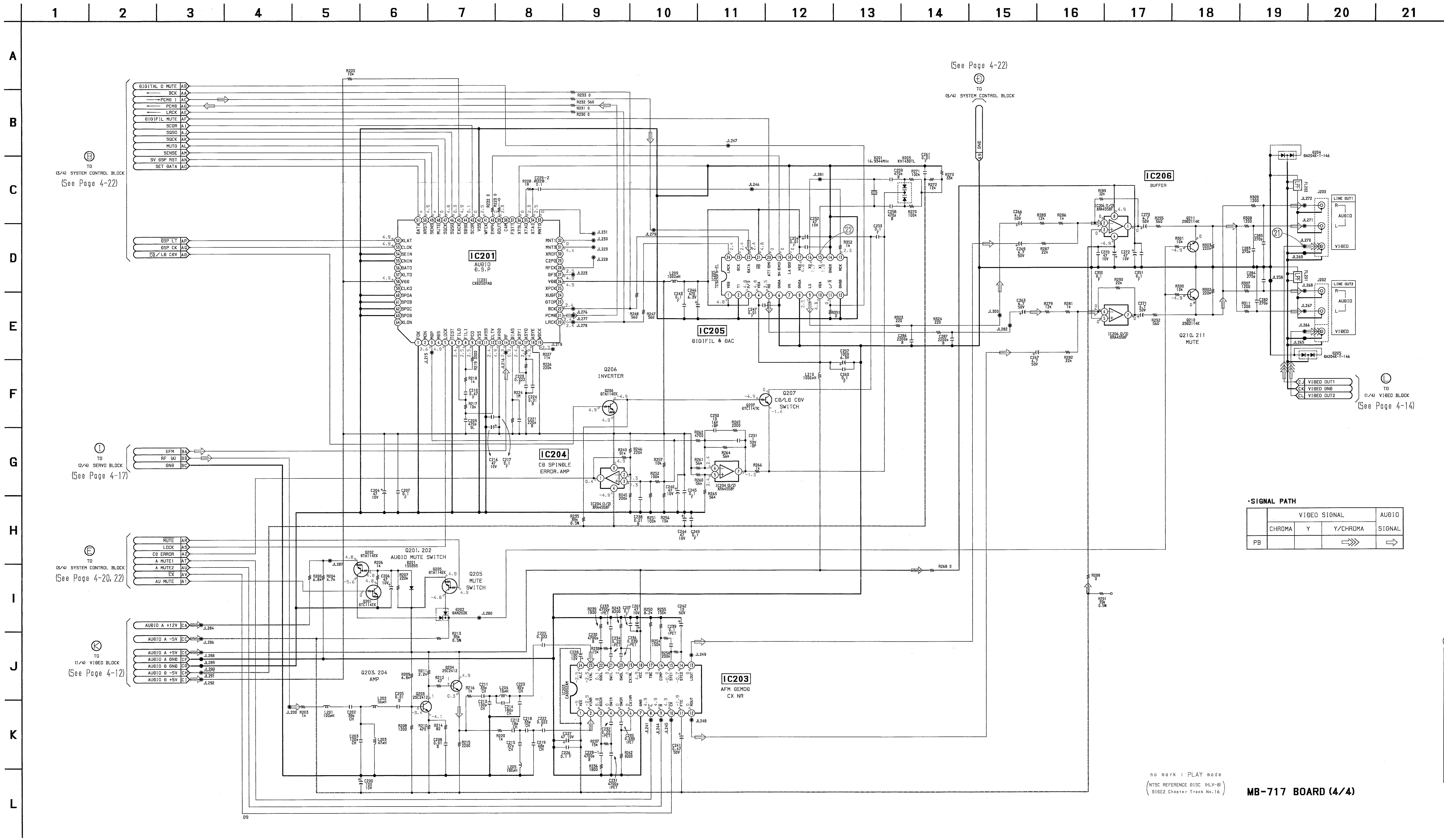
no mark : PAUSE mode
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)

MB-717 BOARD (3/4)

MB-717 (AUDIO) SCHEMATIC DIAGRAM

• Refer to page 4-6 for printed wiring board.

— Ref. No. MB-717 BOARD: 1000 series —


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
A B C D E F G H I J K L
B
TO
(3/4) SYSTEM CONTROL BLOCK
(See Page 4-22)
DIGITAL O MUTE AB
BCK AA
PCMD I AC
PCMD AD
LRCK AE
DIGIFIL MUTE AF
SCOR AI
SQSO AJ
SQCK AK
MUTG AL
SENSE AM
SV DSP RST AN
SET DATA AO
DSP LT AP
DSP CK AQ
CD/LD CDV AG
IC201
AUDIO D.S.P
CXD2507AQ
IC205
DIGIFIL & DAC
IC206
BUFFER
IC204
CD SPINDLE ERROR.AMP
IC203
AFM DEMOD CX NR
Q206 INVERTER
Q207 CD/LD CDV SWITCH
Q201, 202 AUDIO MUTE SWITCH
Q205 MUTE SWITCH
Q203, 204 AMP
Q210, 211 MUTE
(See Page 4-22)
E
TO
(3/4) SYSTEM CONTROL BLOCK
I
TO
(2/4) SERVO BLOCK
(See Page 4-17)
EFM BA
RF (A) BB
GND BC
E
TO
(3/4) SYSTEM CONTROL BLOCK
(See Page 4-20, 22)
MUTE AR
LOCK AS
CD ERROR AZ
A MUTE1 AT
A MUTE2 AU
CX AV
AU MUTE A1
K
TO
(1/4) VIDEO BLOCK
(See Page 4-12)
AUDIO A +12V CA
AUDIO A -5V CC
AUDIO A +5V CE
AUDIO A GND CF
AUDIO D GND CG
AUDIO D -5V CH
AUDIO D +5V CI
JL284
JL286
JL288
JL289
JL290
JL291
JL292
J205
LINE OUT1
AUDIO
VIDEO
J202
LINE OUT2
L
TO
(1/4) VIDEO BLOCK
(See Page 4-14)
VIDEO OUT1 CJ
VIDEO GND CK
VIDEO OUT2 CL
X201 16.9344MHz
21
22

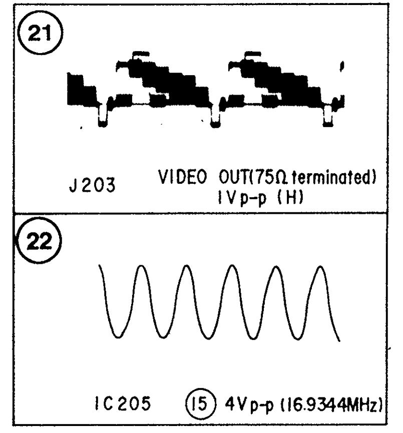
·SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
PB			⇒⟫	⇒

no mark : PLAY mode
(NTSC REFERENCE DISC (HLV-8)
SIDE2 Chapter Track No.16)

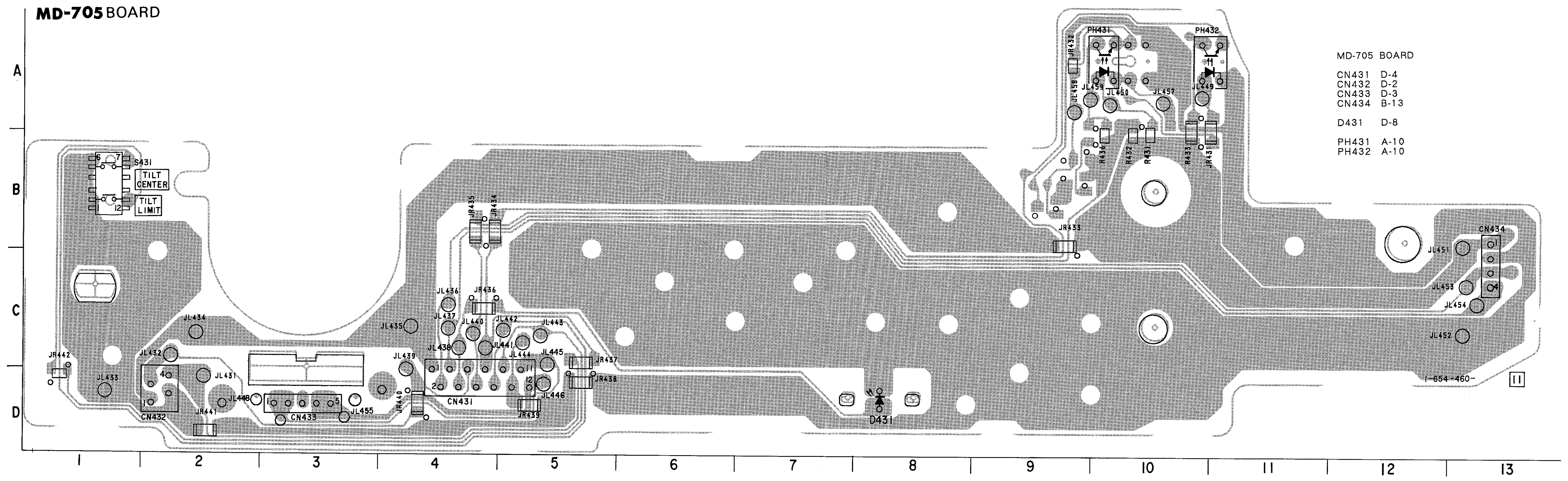
MB-717 BOARD (4/4)

MB-717 BOARD(4/4)
no mark : PAUSE mode.
(NTSC REFERENCE DISC(HLV-8)
SIDE1 Frame No.4100)

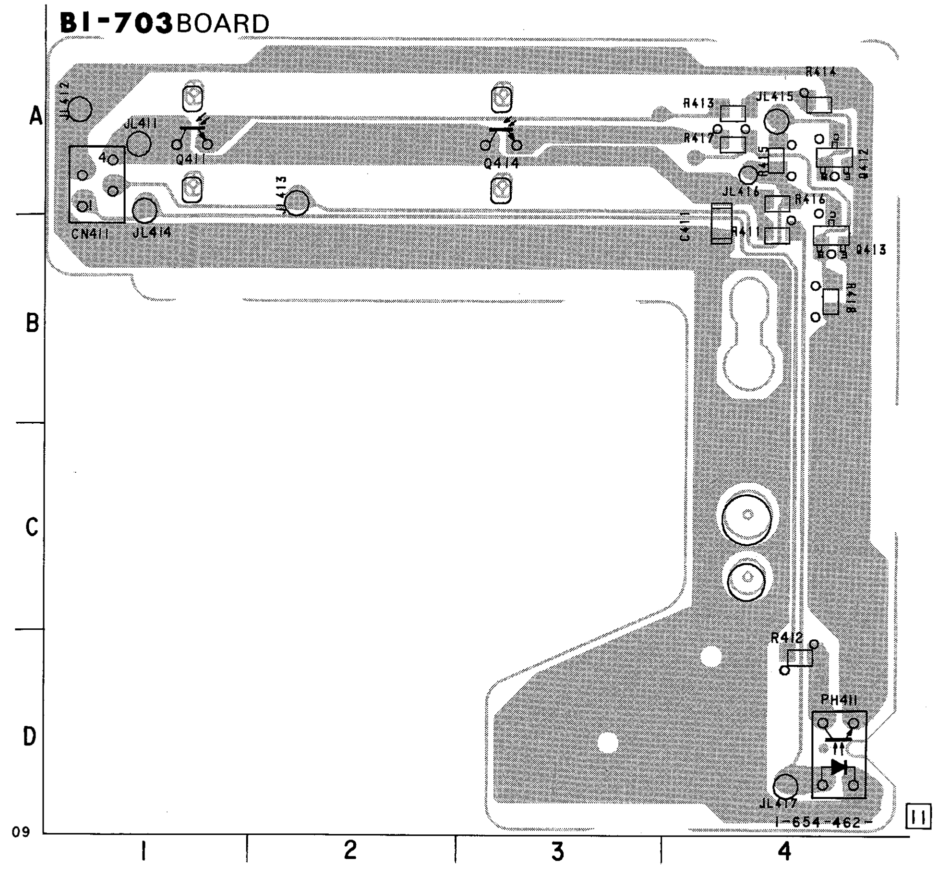


BI-703, MD-705 (SLED POSITION DETECT), FG-707 (SPINDLE FG DETECT), MT-706 (TILT MOTOR) PRINTED WIRING BOARDS

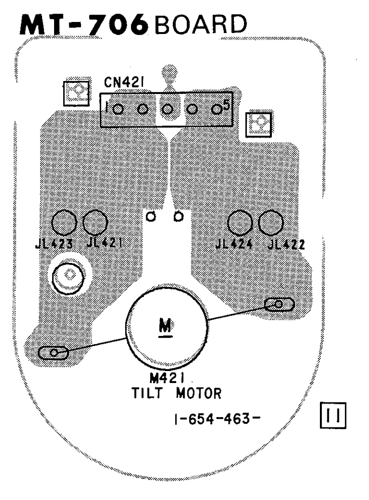
— Ref. No. BI-703, MD-705, FG-707 and MT-706 BOARDS: 2000 series —

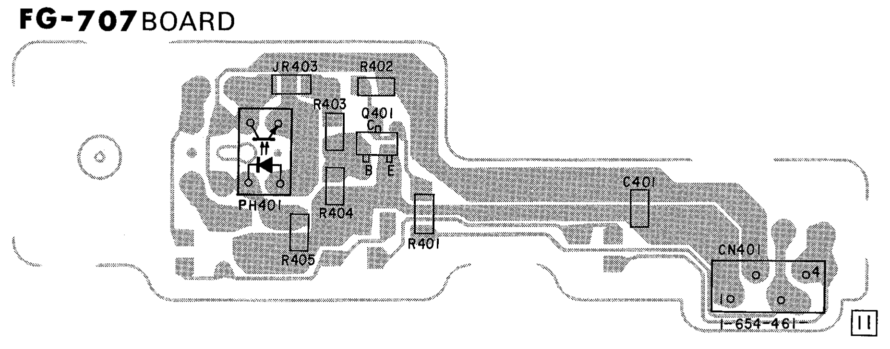

MD-705 BOARD
A
B
C
D
TILT CENTER
TILT LIMIT
PH431
PH432
CN434
CN431
CN432
CN433
D431
1-654-460-
1
2
3
4
5
6
7
8
9
10
11
12
13

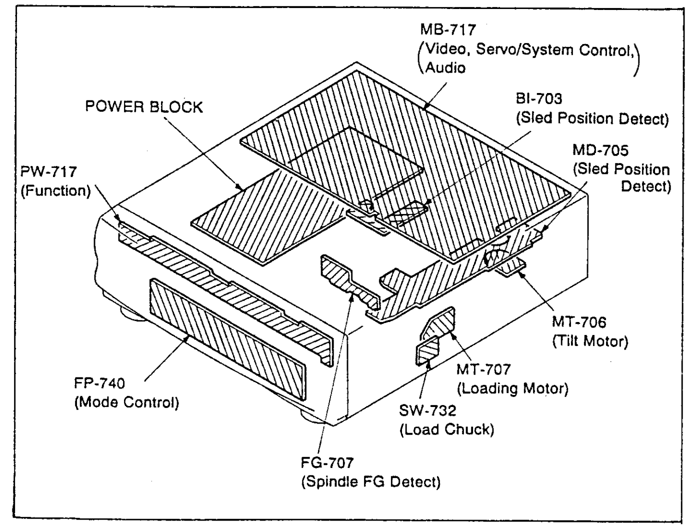
MD-705 BOARD	
CN431	D-4
CN432	D-2
CN433	D-3
CN434	B-13
D431	D-8
PH431	A-10
PH432	A-10


BI-703BOARD
A
B
C
D
CN411
Q411
Q414
PH411
R412
1-654-462-
09
1
2
3
4

BI-703	BOARD
CN411	A-1
PH411	D-4
Q411	A-1
Q412	A-4
Q413	B-4
Q414	A-3

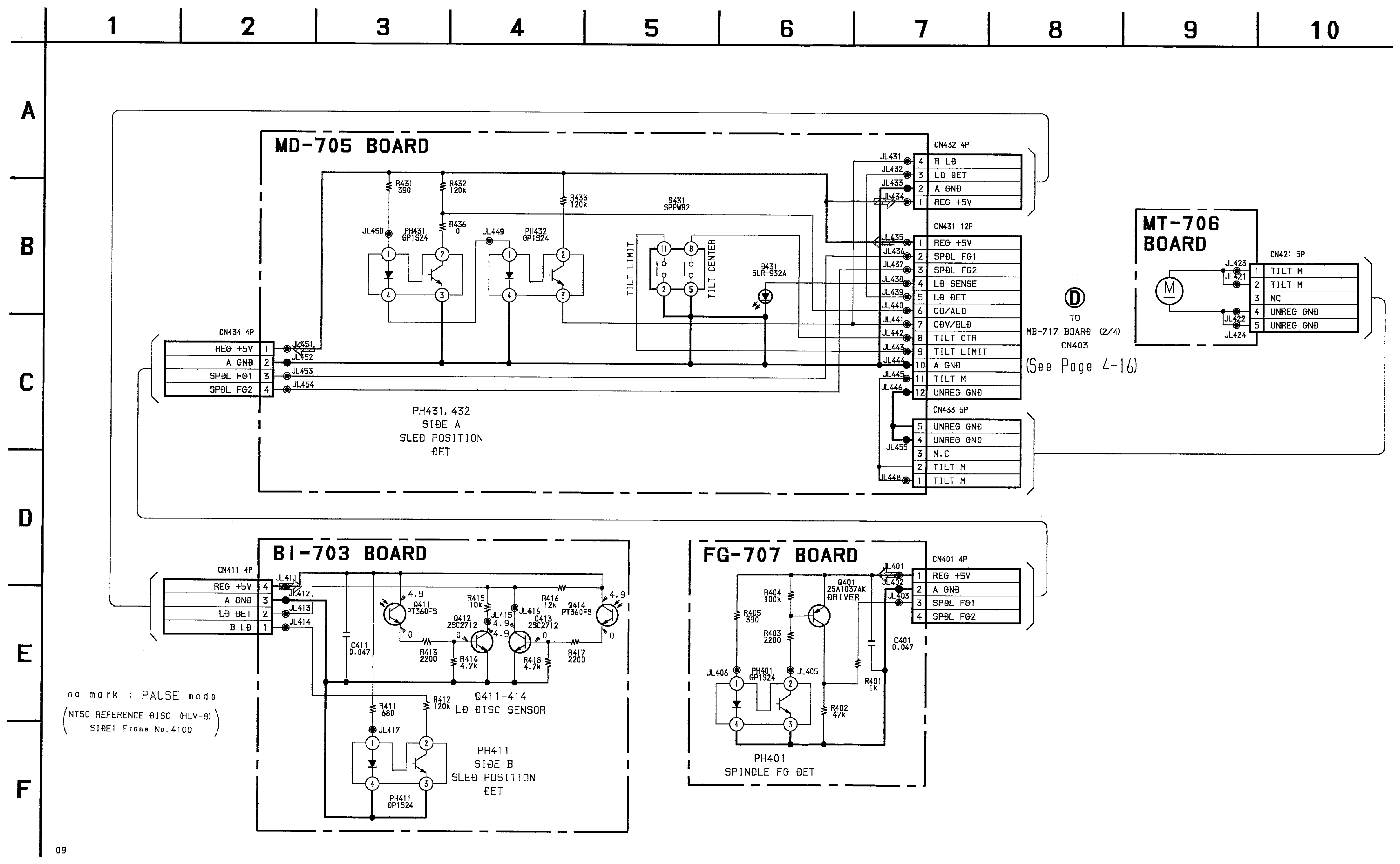

MT-706BOARD
CN421
M
M421
TILT MOTOR
1-654-463-


FG-707BOARD
PH401
Q401
C401
CN401
1-654-461-


MB-717
(Video, Servo/System Control, Audio)
POWER BLOCK
BI-703
(Sled Position Detect)
MD-705
(Sled Position Detect)
PW-717
(Function)
MT-706
(Tilt Motor)
MT-707
(Loading Motor)
FP-740
(Mode Control)
SW-732
(Load Chuck)
FG-707
(Spindle FG Detect)

BI-703, MD-705 (SLED POSITION DETECT), FG-707 (SPINDLE FG DETECT), MT-706 (TILT MOTOR) SCHEMATIC DIAGRAM

— Ref. No. BI-703, MD-705, FG-707 and MT-706 BOARDS: 2000 series —

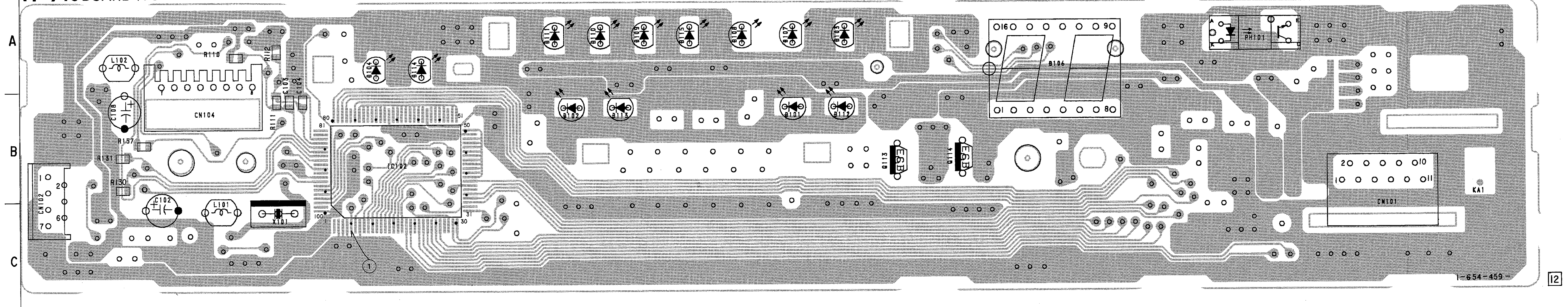

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
MD-705 BOARD
CN434 4P
REG +5V
A GND
SPDL FG1
SPDL FG2
R431 390
R432 120k
R433 120k
R436 0
JL450
PH431 GP1S24
JL449
PH432 GP1S24
S431 SPPW82
TILT LIMIT
TILT CENTER
D431 SLR-932A
PH431, 432
SIDE A
SLED POSITION
DET
CN432 4P
B LD
LD DET
A GND
REG +5V
CN431 12P
REG +5V
SPDL FG1
SPDL FG2
LD SENSE
LD DET
CD/ALD
CDV/BLD
TILT CTR
TILT LIMIT
A GND
TILT M
UNREG GND
CN433 5P
UNREG GND
UNREG GND
N.C
TILT M
TILT M
D
TO
MB-717 BOARD (2/4)
CN403
(See Page 4-16)
MT-706 BOARD
M
CN421 5P
TILT M
TILT M
NC
UNREG GND
UNREG GND
BI-703 BOARD
CN411 4P
REG +5V
A GND
LD DET
B LD
Q411 PT360FS
Q412 2SC2712
Q413 2SC2712
Q414 PT360FS
R413 2200
R414 4.7k
R415 10k
R416 12k
R417 2200
R418 4.7k
C411 0.047
R411 680
R412 120k
Q411-414
LD DISC SENSOR
PH411
SIDE B
SLED POSITION
DET
PH411 GP1S24
FG-707 BOARD
CN401 4P
REG +5V
A GND
SPDL FG1
SPDL FG2
Q401 2SA1037AK DRIVER
R404 100k
R405 390
R403 2200
R402 47k
R401 1k
C401 0.047
PH401 GP1S24
PH401
SPINDLE FG DET
09

no mark : PAUSE mode
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)

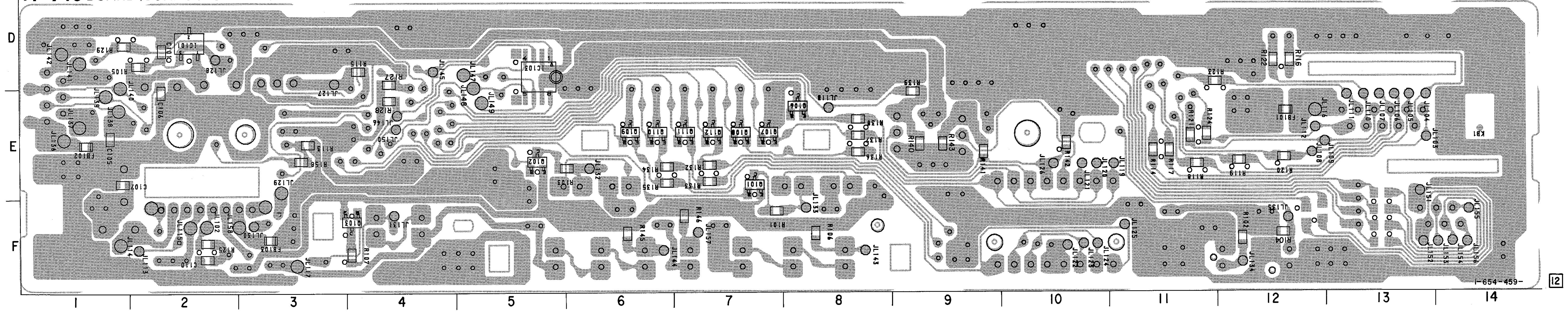
FP-740 (MODE CONTROL), PW-717 (FUNCTION) PRINTED WIRING BOARDS

— Ref. No. FP-740 and PW-717 BOARDS: 3000 series —

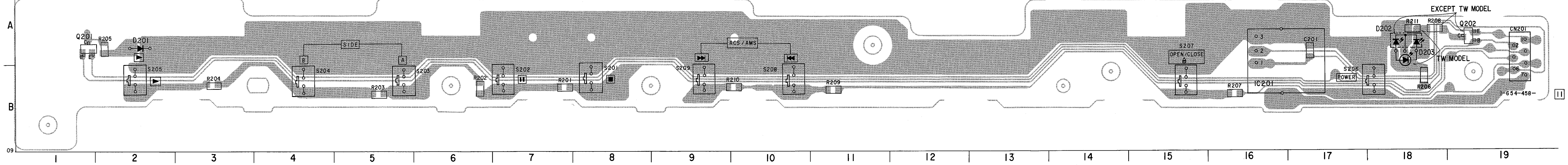
FP-740 BOARD (COMPONENT SIDE)


A
B
C
CN104
IC102
CN102
CN101
L101
L102
IC101
PH101
KA1
D101
D102
D103
D104
D106
D107
D108
D109
D110
D111
D112
D113
D114
D115
Q113
Q114
①
1-654-459-
12

FP-740 BOARD (CONDUCTOR SIDE)


D
E
F
IC101
IC103
KA1
1-654-459-
12
1
2
3
4
5
6
7
8
9
10
11
12
13
14

PW-717 BOARD


A
B
Q201
R205
D201
S205
R204
SIDE
B
A
S204
R203
S203
R202
S202
R201
S201
ACS / AMS
S209
R210
S208
R209
S207
OPEN/CLOSE
R207
IC201
C201
S206
POWER
D202
R211
R208
EXCEPT TW MODEL
Q202
D203
TW MODEL
R206
CN201
1-654-458-
11
09
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

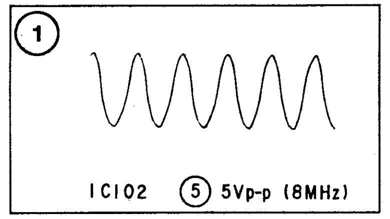
FRONT

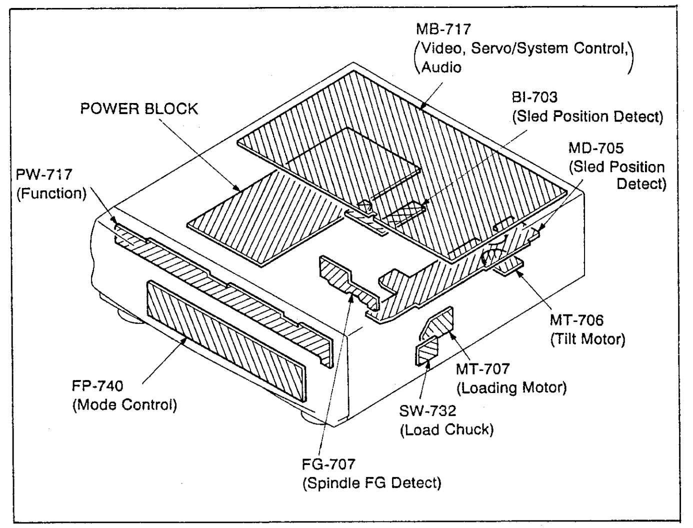
FP-740 BOARD	
CN101	B-13
CN102	B-1
CN104	B-2
D101	B-8
D102	B-6
D103	A-8
D104	A-4
D106	A-10
D107	A-8
D108	A-7
D109	A-6
D110	A-6
D111	A-5
D112	B-8
D113	B-6
D114	A-4
D115	A-7
IC101	D-2
IC102	B-4
IC103	D-5
PH101	A-12
Q101	E-7
Q102	E-5
Q103	F-4
Q106	E-8
Q107	E-7
Q108	E-7
Q109	E-6
Q110	E-6
Q111	E-7
Q112	E-7
Q113	B-9
Q114	B-9

FP-740 BOARD

no mark : PAUSE mode.

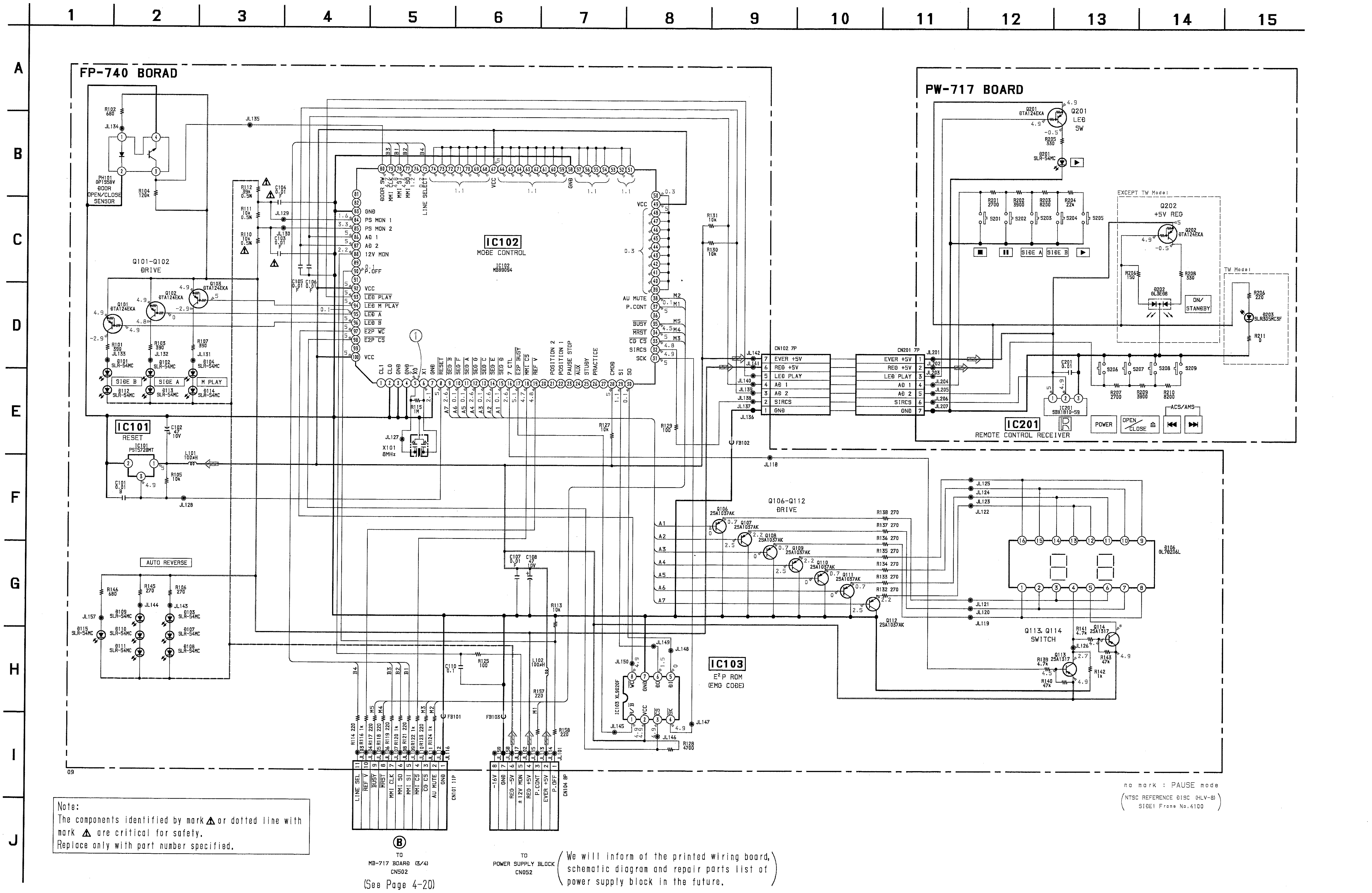
(NTSC REFERENCE DISC (HLV-8)
SIDE1 Frame No.4100)




MB-717
(Video, Servo/System Control, Audio)
POWER BLOCK
BI-703
(Sled Position Detect)
MD-705
(Sled Position Detect)
PW-717
(Function)
MT-706
(Tilt Motor)
MT-707
(Loading Motor)
FP-740
(Mode Control)
SW-732
(Load Chuck)
FG-707
(Spindle FG Detect)

FP-740 (MODE CONTROL), PW-717 (FUNCTION) SCHEMATIC DIAGRAM

— Ref. No. FP-740 and PW-717 BOARDS: 3000 series —


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I J
FP-740 BORAD
PW-717 BOARD
PH101 GP1S58V DOOR OPEN/CLOSE SENSOR
Q101-Q102 DRIVE
SIDE B
SIDE A
M PLAY
IC101 RESET
IC101 PST572BMT
L101 100μH
X101 8MHz
IC102 MODE CONTROL
IC102 MB89094
AUTO REVERSE
CN102 7P
EVER +5V
REG +5V
LED PLAY
AD 1
AD 2
SIRCS
GND
CN201 7P
Q201 LED SW
EXCEPT TW Model
Q202 +5V REG
TW Model
ON/ STANDBY
IC201 SBX1810-59
IC201 REMOTE CONTROL RECEIVER
POWER
OPEN/CLOSE
ACS/AMS
SIDE A
SIDE B
Q106-Q112 DRIVE
Q113, Q114 SWITCH
IC103 E²P ROM (EMG CODE)
CN101 11P
LINE SEL
REF V
BUSY
MRST
MMI CLK
MMI SO
MMI SI
MMI CS
CG CS
AU MUTE
GND
CN104 8P
-16V
GND
REG -5V
±12V MON
REG +5V
P.CONT
EVER +5V
P.OFF
ⓑ
TO MB-717 BOARD (3/4) CN502
(See Page 4-20)
TO POWER SUPPLY BLOCK CN052

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

(We will inform of the printed wiring board, schematic diagram and repair parts list of power supply block in the future.)

no mark : PAUSE mode
(NTSC REFERENCE DISC (HLV-B) SIDE1 Frame No.4100)

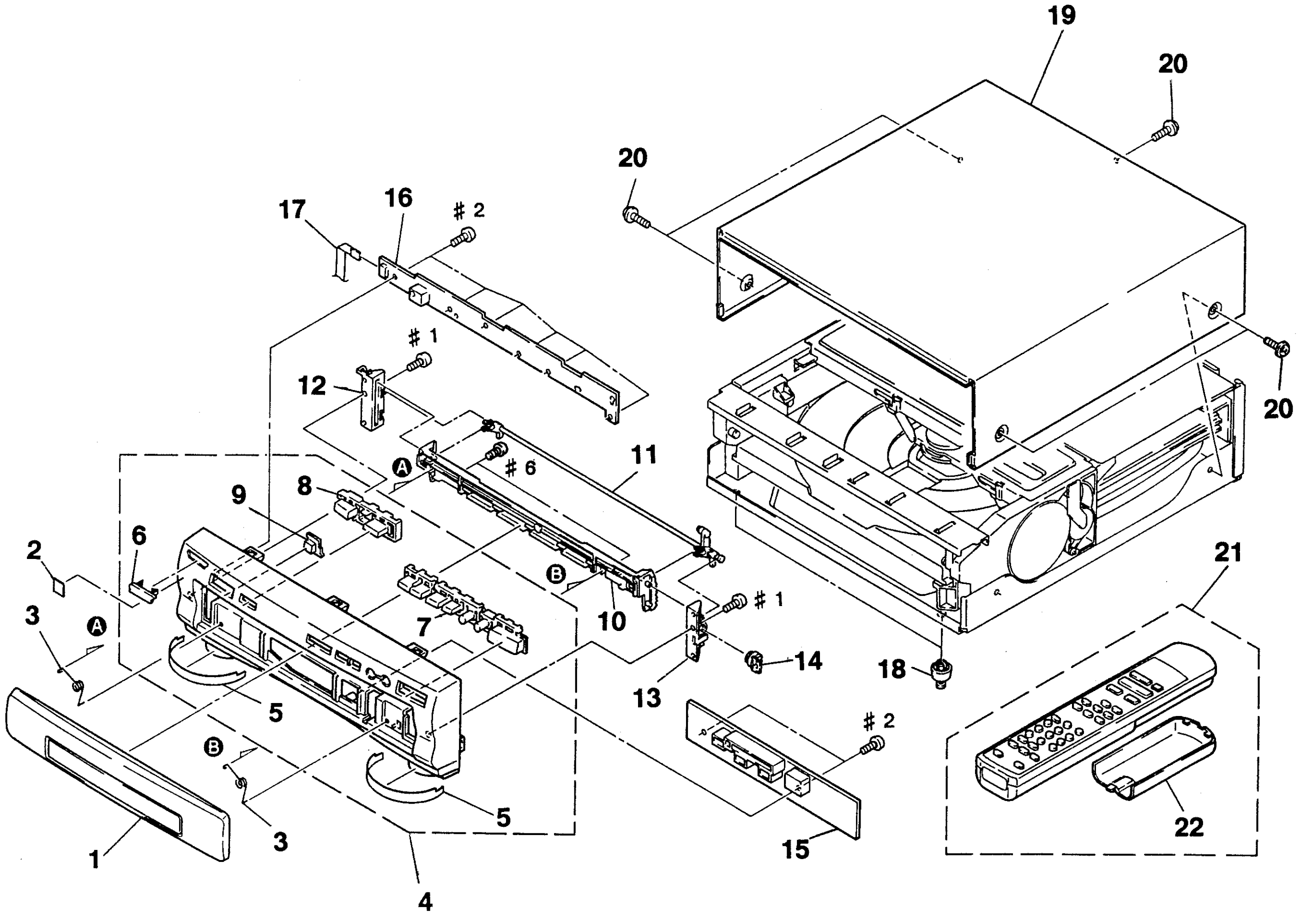
SECTION 5
REPAIR PARTS LIST

5-1. EXPLODED VIEWS

NOTE:
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.
- Abbreviation
  - CN: Chinese model
  - HK: Hong Kong model
  - C&SA: Central & South America model
  - TW: Taiwan model

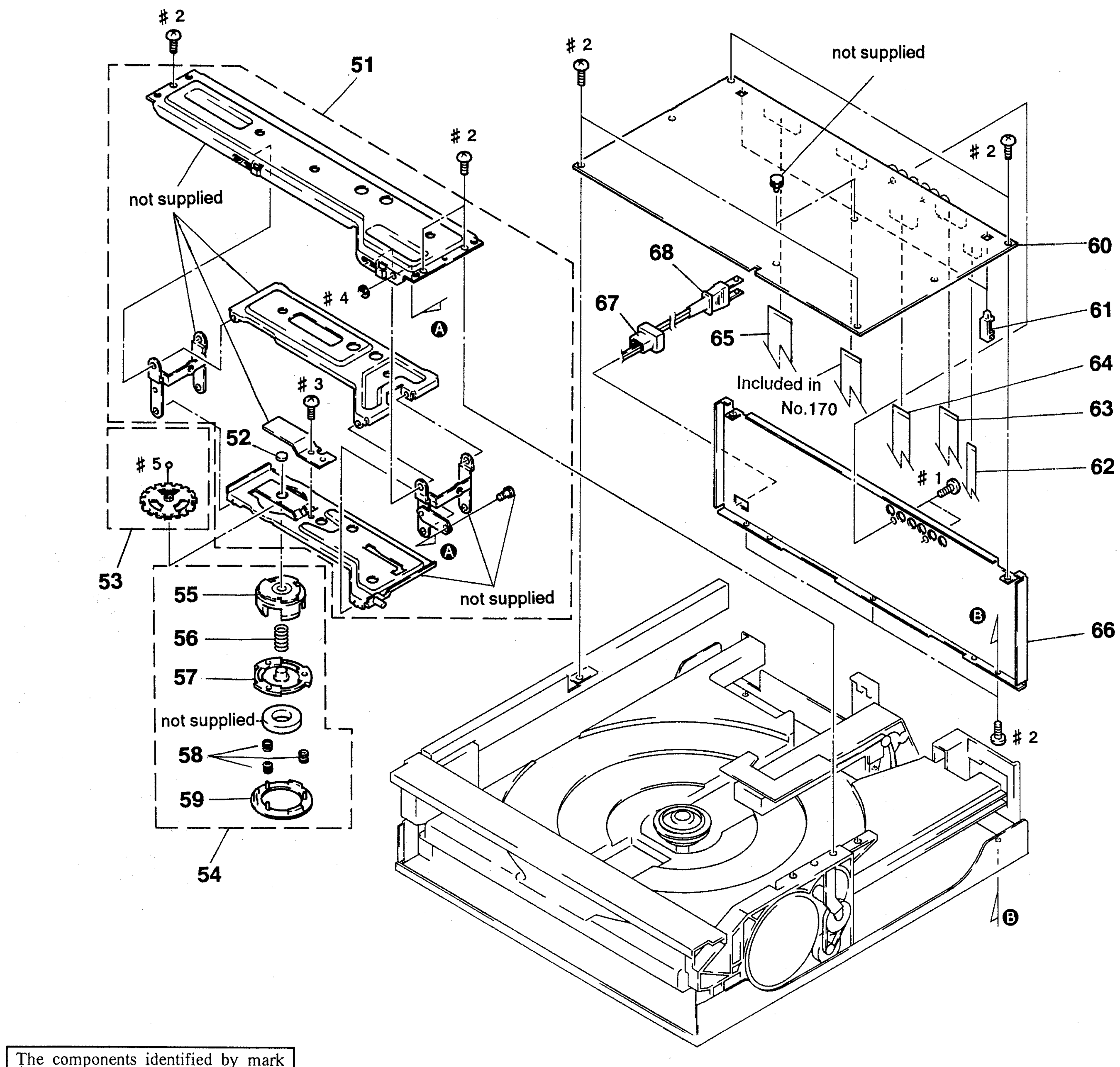
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-1. CASE AND FRONT PANEL ASSEMBLY



Ref. No.	Part No.	Description	Remark
1	X-3944-515-1	DOOR (90E) ASSY (EXCEPT TW)	
* 1	X-3944-697-1	DOOR (90TW) ASSY (TW)	
2	3-703-710-41	STICKER, SONY SYMBOL (12)	
3	3-961-063-01	SPRING, TORSION	
4	X-3944-516-1	PANEL (90E) ASSY, FRONT (EXCEPT TW)	
* 4	X-3944-698-1	PANEL (90TW) ASSY, FRONT (TW)	
5	3-961-068-11	SEAL, FOOT	
6	3-942-768-02	EMBLEM (NO. 5), SONY	
7	X-3944-509-1	BUTTON (90J) ASSY, PLAY (TW)	
7	X-3944-517-1	BUTTON (90E) ASSY, PLAY (EXCEPT TW)	
8	X-3944-510-1	BUTTON (90J) ASSY, POWER (TW)	
8	X-3944-518-1	BUTTON (90E) ASSY, POWER (EXCEPT TW)	
9	3-961-067-01	WINDOW, RAY CATCHER	
10	3-961-075-01	DISK, DOOR	
11	X-3944-519-1	LINK ASSY, DRIVING	
12	3-961-064-01	HOLDER (L), SLIDE	
13	3-961-065-01	HOLDER (R), SLIDE	
14	4-919-393-01	DAMPER	
* 15	A-6423-234-A	FP-740 BOARD, COMPLETE (EXCEPT TW)	
* 15	A-6423-271-A	FP-740 BOARD, COMPLETE (TW)	
* 16	A-6423-235-A	PW-717 BOARD, COMPLETE	
17	1-769-150-11	FLAT CABLE (FFP-001)(7 CORE)	
18	3-961-156-01	FOOT	
* 19	3-961-111-01	CASE, UPPER (EXCEPT TW)	
* 19	3-961-111-11	CASE, UPPER (TW)	
20	3-710-901-11	SCREW, TAPPING	
21	A-6772-990-A	REMOTE CONTROL COMPLETE ASSY (EXCEPT TW)	
* 21	A-6778-030-A	REMOTE CONTROL COMPLETE ASSY (TW)	
* 22	3-959-554-01	COVER (ATW), BATTERY	

5-1-2. CHUCKING BLOCK ASSEMBLY

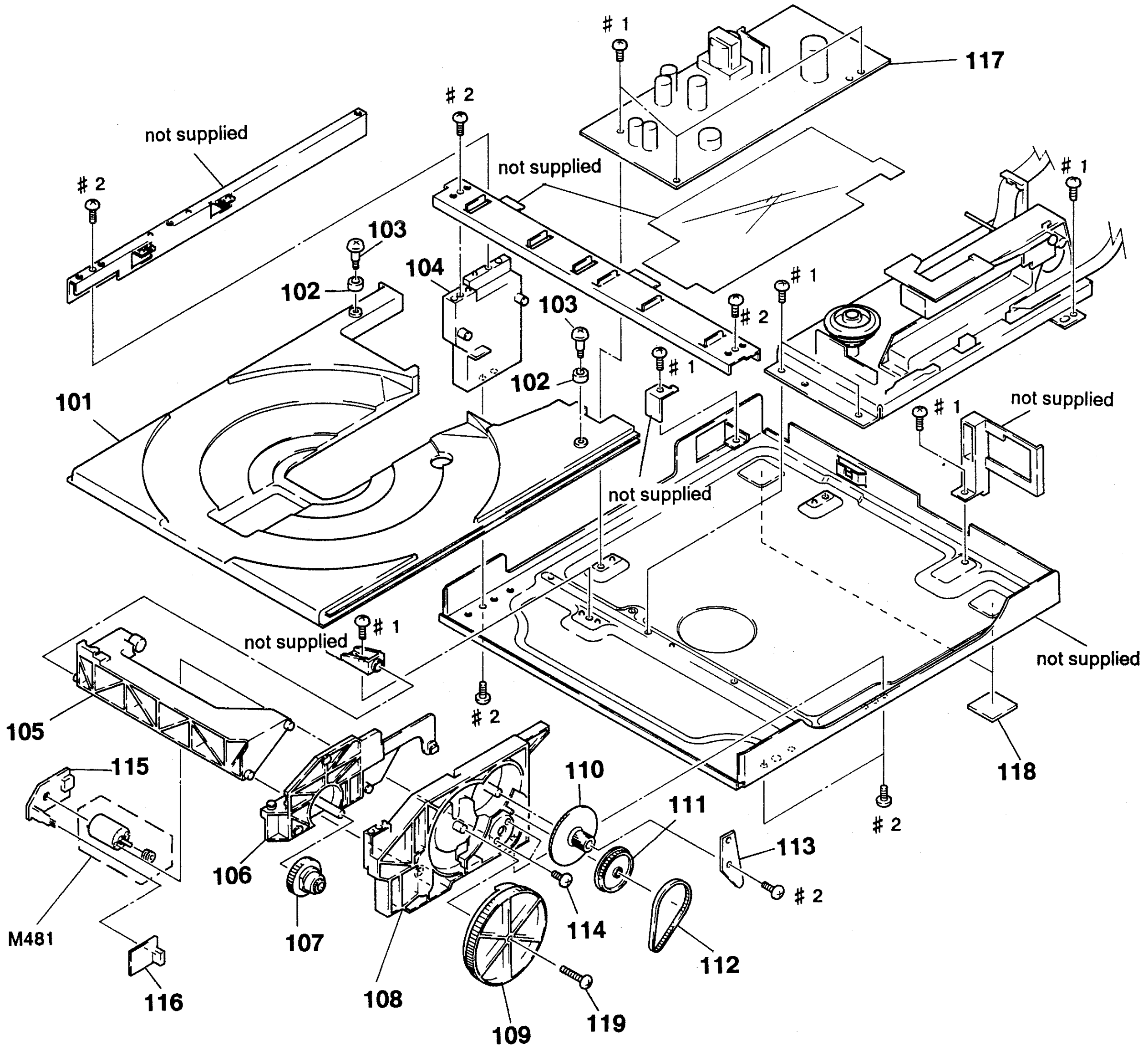


# 2
51
# 2
not supplied
# 4
A
# 3
52
# 5
53
55
56
57
not supplied
58
59
54
A
not supplied
# 2
not supplied
68
67
65
Included in
No.170
# 2
60
61
64
63
62
# 1
B
66
# 2
B

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 51	A-6415-863-A	CHUCKING, SUB BLOCK ASSY	
52	3-953-392-01	RETAINER, THRUST	
53	X-3942-787-1	PLATE ASSY, TOP	
54	A-6415-644-G	CHUCK BLOCK ASSY	
55	X-3942-776-1	HOLDER ASSY, MAGNET	
56	3-953-291-01	SPRING (1), COMPRESSION	
57	3-953-288-01	PLATE, CHUCKING	
58	3-953-290-01	SPRING (2), COMPRESSION	
59	X-3943-043-1	GUIDE (B) ASSY, CENTER	
* 60	A-6423-233-A	MB-717 BOARD, COMPLETE (EXCEPT TW)	
* 60	A-6423-270-A	MB-717 BOARD, COMPLETE (TW)	
* 61	3-961-116-01	GUIDE, MB	
62	1-769-148-11	FLAT CABLE (FMM-001)(7 CORE)	
63	1-769-149-11	FLAT CABLE (FUF-002)(11 CORE)	
64	1-769-147-11	FLAT CABLE (FMD-003)(12 CORE)	
65	1-769-146-11	FLAT CABLE (FMP-002)(19 CORE)	
* 66	3-961-079-01	PANEL, REAR (EXCEPT TW)	
* 66	3-961-079-21	PANEL, REAR (TW)	
⚠*67	3-703-244-00	BUSHING (2104), CORD (EXCEPT TW)	
⚠*67	3-703-571-11	BUSHING (4516), CORD (TW)	
⚠68	1-575-912-21	CORD, POWER (EXCEPT TW)	
⚠*68	1-769-500-11	CORD, POWER (TW)	

5-1-3. MAIN CHASSIS ASSEMBLY



# 1
117
# 2
not supplied
# 2
not supplied
# 1
103
104
102
103
# 1
# 2
102
# 1
101
not supplied
# 1
not supplied
not supplied
# 1
not supplied
105
# 2
115
110
111
118
# 2
113
# 2
106
107
114
M481
112
116
108
119
109

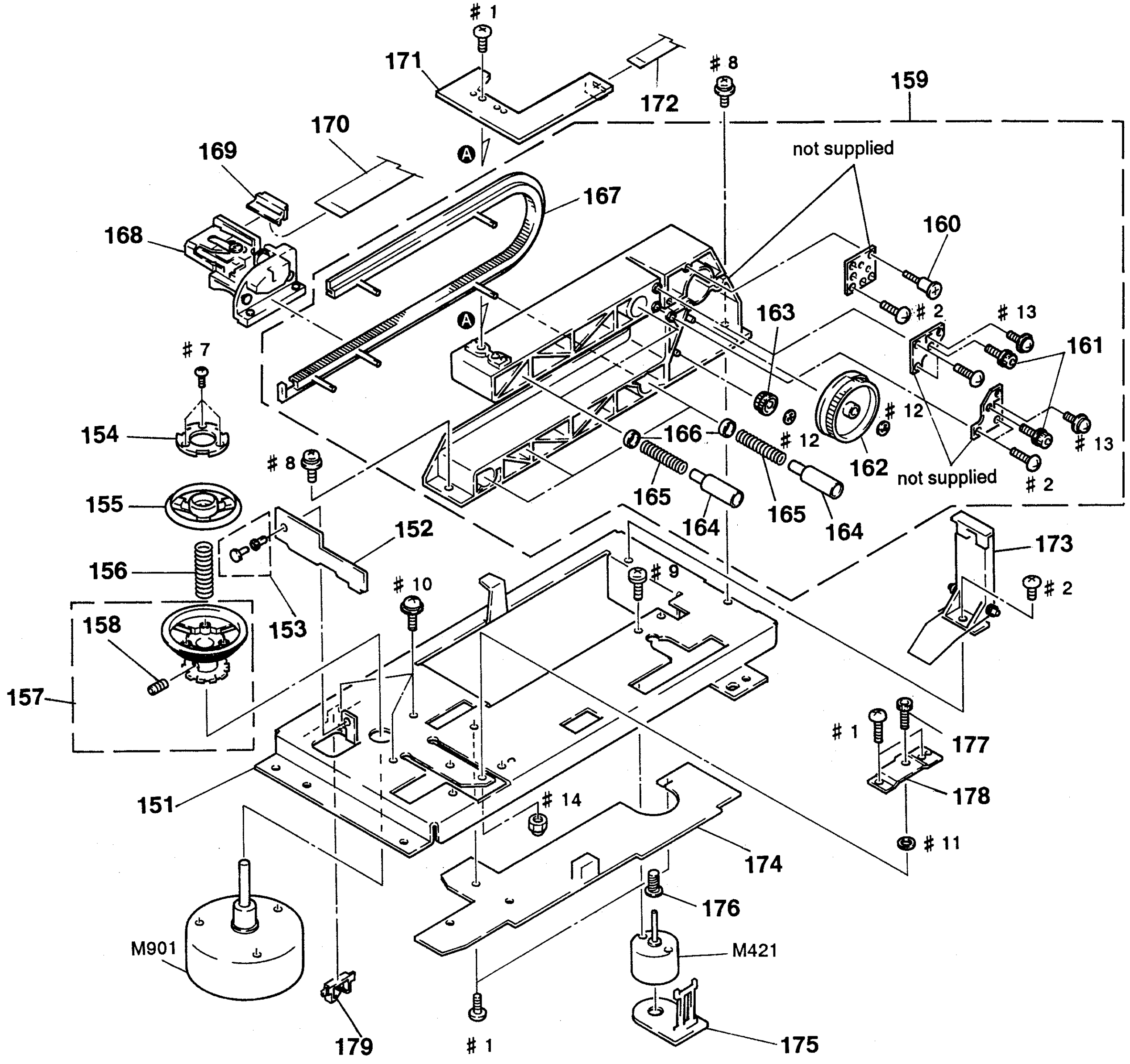
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note:The parts No. of ref. No.117 is shown in the supplement.

Ref. No.	Part No.	Description	Remark
101	A-6415-859-A	TRAY (90E) ASSY	
* 102	4-914-248-01	STOPPER, RUBBER	
103	3-741-948-01	SCREW (3), SPECIAL (+) TAPPING	
* 104	X-3944-523-1	STAY (L) ASSY, F	
* 105	X-3944-520-1	FRAME ASSY, TRAY UD	
106	X-3944-514-1	BASE ASSY, L SUB	
107	3-961-085-01	GEAR, IDLER	
108	X-3944-513-1	BASE ASSY, LOADING	
109	3-961-083-01	GEAR, CONTROL	
110	3-961-081-01	GEAR, MIDDLE	
111	3-961-084-01	PULLEY (A)	

Ref. No.	Part No.	Description	Remark
112	3-961-082-01	BELT, TIMING	
* 113	3-962-050-01	STAY, REINFORCEMENT	
114	3-962-049-01	SCREW, MOTOR STOPPER	
* 115	1-654-464-11	MT-707 BOARD	
* 116	A-6423-236-A	SW-732 BOARD, COMPLETE	
⚠117	————	POWER BLOCK (TW)	
⚠117	1-413-989-11	POWER BLOCK (EXCEPT TW)	
118	3-961-110-01	CUSHION, FOOT	
119	3-962-812-01	SCREW +BVTP 3X18 TYPE 2	
M481	X-3944-685-1	MOTOR ASSY, LOADING (RF-370C)	

5-1-4. MECHANISM DECK ASSEMBLY



# 1
171
172
# 8
159
170
169
A
not supplied
167
168
160
A
163
# 2
# 13
161
# 7
# 12
# 12
154
166
# 8
162
not supplied
# 2
# 13
155
165
164
165
164
152
173
156
# 10
# 9
# 2
158
153
157
# 1
177
151
# 14
178
# 11
174
176
M421
M901
179
# 1
175

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 151	3-961-112-01	PLATE, BASE	
* 152	A-6423-231-A	FG-707 BOARD, COMPLETE	
* 153	3-954-681-01	RIVET, NYLON	
154	3-953-293-01	PLATE (C), YOKE	
155	3-953-292-01	GUIDE, CENTER	
156	3-953-289-01	SPRING (3), COMPRESSION	
157	X-3942-779-1	TURNTABLE ASSY	
158	3-701-507-00	SET SCREW, DOUBLE POINT, (M3X5)	
159	A-6404-105-A	BASE BLOCK ASSY, FEED	
160	3-961-208-01	SCREW, FLEXIBLE DISPOSITION	
161	3-899-249-01	BOLT, HEXAGON SOCKET	
162	3-953-254-01	CAM, TILT DRIVING	
163	3-953-259-01	GEAR, TILT MIDWAY	
164	3-953-255-03	HOLDER, U	
165	3-953-267-01	SPRING, COMPRESSION	
166	3-953-830-01	WASHER, U	
167	3-961-126-01	GUIDE (900), U	
⚠168	8-848-286-11	DEVICE, OPTICAL KHS-150A(S)	
169	3-953-268-01	HOLDER (18P), FLEXIBLE	
170	1-751-083-21	CABLE, FLEXIBLE FLAT (18 CORE)	
* 171	A-6423-232-A	BI-703 BOARD, COMPLETE	
172	1-769-151-11	FLAT CABLE (FMB-001)(4 CORE)	
173	A-6404-107-A	STAND ASSY, FLEXIBLE RETAINER	
* 174	A-6423-230-A	MD-705 BOARD, COMPLETE	
* 175	A-6423-229-A	MT-706 BOARD, COMPLETE	
176	3-961-973-01	GEAR, WORM	
177	3-953-829-01	BOLT	
* 178	3-953-258-11	PLATE, ADJUSTMENT, AT	
* 179	3-961-199-01	SADDLE, EDGE	
M421	1-541-930-11	MOTOR, DC (TILT)	
M901	1-698-109-11	MOTOR, DD (SPINDLE)	

5-2. ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Hardware (# mark) list is given in the last of this parts list.
- Abbreviation
  CN: Chinese model
  HK: Hong Kong model
  TW: Taiwan model
  C&SA: Central & South America model
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH

Ref. No.	Part No.	Description	Remark
*	A-6423-232-A	BI-703 BOARD, COMPLETE	
		************************	
			(Ref. No. 2,000 Series)
	3-953-261-01	HOLDER, PD	
		< CAPACITOR >	
C411	1-163-075-00	CERAMIC CHIP 0.047uF	50V
		< CONNECTOR >	
CN411	1-691-063-21	HOUSING, CONNECTOR 4P	
		< PHOTO INTERUPTER >	
PH411	8-729-020-74	DIODE GP1S24	
		< TRANSISTOR >	
Q411	8-729-904-10	TRANSISTOR PT360FS	
Q412	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q413	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q414	8-729-904-10	TRANSISTOR PT360FS	
		< RESISTOR >	
R411	1-216-045-00	METAL CHIP 680 5% 1/10W	
R412	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R413	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R414	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R415	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R416	1-216-075-00	METAL CHIP 12K 5% 1/10W	
R417	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R418	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	

****

Ref. No.	Part No.	Description	Remark
*	A-6423-231-A	FG-707 BOARD, COMPLETE	
		************************	
			(Ref. No. 2,000 Series)
		< CAPACITOR >	
C401	1-163-035-00	CERAMIC CHIP 0.047uF	50V
		< CONNECTOR >	
CN401	1-691-863-11	CONNECTOR, BOARD TO BOARD 4P	
		< JUMPER RESISTOR >	
JR403	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< PHOTO INTERUPTER >	
PH401	8-729-020-74	DIODE GP1S24	
		< TRANSISTOR >	
Q401	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
		< RESISTOR >	
R401	1-216-198-91	METAL GLAZE 1K 5% 1/8W	
R402	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R403	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R404	1-216-097-00	METAL CHIP 100K 5% 1/10W	
R405	1-216-039-00	METAL CHIP 390 5% 1/10W	

****

Ref. No.	Part No.	Description	Remark
*	A-6423-234-A	FP-740 BOARD, COMPLETE (EXCEPT TW)	
		***********************************	
*	A-6423-271-A	FP-740 BOARD, COMPLETE (TW)	
		****************************	
			(Ref. No. 3,000 Series)
*	3-956-076-01	HOLDER, SEGMENT	
*	3-961-102-01	REFLECTOR	
		< CAPACITOR >	
C101	1-164-232-11	CERAMIC CHIP 0.01uF	50V
C102	1-124-589-11	ELECT 47uF 20%	16V
⚠C103	1-163-031-11	CERAMIC CHIP 0.01uF	50V
⚠C104	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C105	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C106	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C107	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C108	1-124-589-11	ELECT 47uF 20%	16V
C110	1-165-319-11	CERAMIC CHIP 0.1uF	50V
		< CONNECTOR >	
CN101	1-770-120-11	CONNECTOR, FFC/FPC 11P	
CN102	1-691-066-21	HOUSING, CONNECTOR 7P	
* CN104	1-569-750-11	PIN, CONNECTOR (PC BOARD) 8P	

FP-740

Ref.No.	Part No.	Description	Remark
		< DIODE >	
D101	8-719-955-04	DIODE PY5504S-1	
D102	8-719-955-04	DIODE PY5504S-1	
D103	8-719-955-04	DIODE PY5504S-1	
D104	8-719-955-04	DIODE PY5504S-1	
D106	8-719-047-76	DIODE GL7D206L	
D107	8-719-955-04	DIODE PY5504S-1	
D108	8-719-955-04	DIODE PY5504S-1	
D109	8-719-955-04	DIODE PY5504S-1	
D110	8-719-955-04	DIODE PY5504S-1	
D111	8-719-955-04	DIODE PY5504S-1	
D112	8-719-955-04	DIODE PY5504S-1	
D113	8-719-955-04	DIODE PY5504S-1	
D114	8-719-955-04	DIODE PY5504S-1	
D115	8-719-955-04	DIODE PY5504S-1	
		< FERRITE BEAD >	
FB101	1-414-135-11	INDUCTOR CHIP 0UH	
FB102	1-414-135-11	INDUCTOR CHIP 0UH	
FB103	1-414-135-11	INDUCTOR CHIP 0UH	
		< IC >	
IC101	8-759-074-40	IC PST572DMT-T1 (RESET)	
IC102	8-759-293-57	IC MB89094PF-G-132-BND (MODE CONTROL)	(EXCEPT TW)
IC102	8-759-328-25	IC MB89094PF-G-134-BND (MODE CONTROL)	(TW)
IC103	8-759-276-29	IC XL9020F-S-E2 (E2P ROM)	
		< COIL >	
L101	1-408-982-11	INDUCTOR 100uH	
L102	1-408-982-11	INDUCTOR 100uH	
		< PHOTO INTERUPTER >	
PH101	8-749-010-69	PHOTO INTARAPUTOR GP1S58V	
		< TRANSISTOR >	
Q101	8-729-027-31	TRANSISTOR DTA124EKA-T146	
Q102	8-729-027-31	TRANSISTOR DTA124EKA-T146	
Q103	8-729-027-31	TRANSISTOR DTA124EKA-T146	
Q106	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q107	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q108	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q109	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q110	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q111	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q112	8-729-026-50	TRANSISTOR 2SA1037AK-T146-QR	
Q113	8-729-820-16	TRANSISTOR 2SA1317-S	
Q114	8-729-820-16	TRANSISTOR 2SA1317-S	

Ref.No.	Part No.	Description	Remark
		< RESISTOR >	
R101	1-216-039-00	METAL CHIP 390 5% 1/10W	
R102	1-216-045-00	METAL CHIP 680 5% 1/10W	
R103	1-216-039-00	METAL CHIP 390 5% 1/10W	
R104	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R105	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R106	1-216-035-00	METAL CHIP 270 5% 1/10W	
R107	1-216-039-00	METAL CHIP 390 5% 1/10W	
⚠R110	1-208-806-11	METAL GLAZE 10K 0.50% 1/10W	
⚠R111	1-208-806-11	METAL GLAZE 10K 0.50% 1/10W	
⚠R112	1-208-820-11	METAL GLAZE 39K 0.50% 1/10W	
R113	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R114	1-216-033-00	METAL CHIP 220 5% 1/10W	
R115	1-216-121-00	METAL CHIP 1M 5% 1/10W	
R116	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R117	1-216-033-00	METAL CHIP 220 5% 1/10W	
R118	1-216-033-00	METAL CHIP 220 5% 1/10W	
R119	1-216-033-00	METAL CHIP 220 5% 1/10W	
R120	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R121	1-216-033-00	METAL CHIP 220 5% 1/10W	
R122	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R123	1-216-033-00	METAL CHIP 220 5% 1/10W	
R124	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R125	1-216-025-00	METAL CHIP 100 5% 1/10W	
R127	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R128	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R129	1-216-025-00	METAL CHIP 100 5% 1/10W	
R130	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R131	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R132	1-216-035-00	METAL CHIP 270 5% 1/10W	
R133	1-216-035-00	METAL CHIP 270 5% 1/10W	
R134	1-216-035-00	METAL CHIP 270 5% 1/10W	
R135	1-216-035-00	METAL CHIP 270 5% 1/10W	
R136	1-216-035-00	METAL CHIP 270 5% 1/10W	
R137	1-216-035-00	METAL CHIP 270 5% 1/10W	
R138	1-216-035-00	METAL CHIP 270 5% 1/10W	
R139	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R140	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R141	1-216-065-00	METAL CHIP 4.7K 5% 1/10W	
R142	1-216-049-00	METAL CHIP 1K 5% 1/10W	
R143	1-216-089-00	METAL CHIP 47K 5% 1/10W	
R145	1-216-035-00	METAL CHIP 270 5% 1/10W	
R146	1-216-045-00	METAL CHIP 680 5% 1/10W	
R157	1-216-033-00	METAL CHIP 220 5% 1/10W	
R158	1-216-033-00	METAL CHIP 220 5% 1/10W	
		< VIBRATOR >	
X101	1-579-952-21	VIBRATOR, CERAMIC (8MHz)	

****

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

* A-6423-233-A MB-717 BOARD, COMPLETE (EXCEPT TW)
****

* A-6423-270-A MB-717 BOARD, COMPLETE (TW)
****

(Ref.No. 1,000 Series)

< CAPACITOR >

Ref. No.	Part No.	Description			Remark
C001	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C002	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C003	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C004	1-124-443-00	ELECT	100uF	20%	10V
C005	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C006	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C007	1-126-177-11	ELECT	100uF	20%	10V
C008	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C009	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C010	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C011	1-124-443-00	ELECT	100uF	20%	10V
C012	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C013	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C014	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C015	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C017	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C018	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C019	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C020	1-126-947-11	ELECT	47uF	20%	10V
C021	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C022	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C023	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C024	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C025	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C026	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C027	1-124-443-00	ELECT	100uF	20%	10V
C028	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C029	1-163-116-00	CERAMIC CHIP	91PF	5%	50V
C030	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C032	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C033	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C034	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C035	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C036	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C037	1-163-108-00	CERAMIC CHIP	43PF	5%	50V
C038	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C039	1-163-114-00	CERAMIC CHIP	75PF	5%	50V
C040	1-124-257-00	ELECT	2.2uF	20%	50V
C041	1-124-925-11	ELECT	2.2uF	20%	100V
C042	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C043	1-163-116-00	CERAMIC CHIP	91PF	5%	50V
C044	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C045	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C046	1-124-443-00	ELECT	100uF	20%	10V
C047	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C048	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C049	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C050	1-126-176-11	ELECT	220uF	20%	10V
C051	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C052	1-163-220-11	CERAMIC CHIP	3PF	0.25PF	50V
C053	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C054	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C055	1-124-443-00	ELECT	100uF	20%	10V
C056	1-124-443-00	ELECT	100uF	20%	10V
C057	1-124-907-11	ELECT	10uF	20%	50V
C058	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C059	1-126-947-11	ELECT	47uF	20%	10V
C060	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C061	1-126-947-11	ELECT	47uF	20%	10V
C062	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C063	1-124-443-00	ELECT	100uF	20%	10V
C064	1-126-947-11	ELECT	47uF	20%	10V
C065	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C066	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C067	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C068	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C069	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C070	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C071	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C072	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C074	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C075	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C076	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C077	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C078	1-124-903-11	ELECT	1uF	20%	50V
C079	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C080	1-124-443-00	ELECT	100uF	20%	10V
C081	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C082	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C083	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C085	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C086	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C088	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C089	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C090	1-126-947-11	ELECT	47uF	20%	10V
C091	1-126-947-11	ELECT	47uF	20%	10V
C092	1-126-947-11	ELECT	47uF	20%	10V
C093	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C094	1-126-947-11	ELECT	47uF	20%	10V
C095	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C096	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C097	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C098	1-124-907-11	ELECT	10uF	20%	50V

MB-717

Ref.No.	Part No.	Description			Remark
C100	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C110	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C111	1-164-346-11	CERAMIC CHIP	1uF		16V
C112	1-124-907-11	ELECT	10uF	20%	50V
C113	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C114	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C115	1-126-947-11	ELECT	47uF	20%	10V
C116	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C118	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C120	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C200	1-124-443-00	ELECT	100uF	20%	10V
C201	1-126-947-11	ELECT	47uF	20%	10V
C202	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C203	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C204	1-126-947-11	ELECT	47uF	20%	10V
C205	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C206	1-126-947-11	ELECT	47uF	20%	10V
C207	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C208	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C209	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C210	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C211	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C212	1-163-099-00	CERAMIC CHIP	18PF	5%	50V
C213	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C214	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C215	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C216	1-126-947-11	ELECT	47uF	20%	10V
C217	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C218	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C219	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C220	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C221	1-163-001-11	CERAMIC CHIP	220PF	10%	50V
C222	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C223	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C224	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C225	1-163-033-91	CERAMIC CHIP	0.022uF		50V
C226	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C227	1-126-947-11	ELECT	47uF	20%	10V
C228	1-124-443-00	ELECT	100uF	20%	10V
C229-1	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C229-2	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C230	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C231	1-137-368-11	FILM	0.0047uF	5%	50V
C232	1-137-378-11	FILM	0.22uF	5%	50V
C233	1-137-368-11	FILM	0.0047uF	5%	50V
C234	1-137-378-11	FILM	0.22uF	5%	50V
C235	1-137-442-11	FILM	0.039uF	5%	50V
C236	1-137-442-11	FILM	0.039uF	5%	50V
C237	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C238	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C239	1-137-399-11	FILM	0.1uF	5%	50V
C240	1-126-947-11	ELECT	47uF	20%	10V
C241	1-124-902-00	ELECT	0.47uF	20%	50V
C242	1-124-907-11	ELECT	10uF	20%	50V
C243	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C244	1-126-947-11	ELECT	47uF	20%	10V
C245	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C246	1-126-935-11	ELECT	470uF	20%	6.3V
C247	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C249	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C250	1-126-320-11	ELECT, NONPOLAR	10uF	20%	16V
C251	1-109-889-11	ELECT	1uF	20%	50V
C252	1-126-947-11	ELECT	47uF	20%	10V
C253	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C254	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C257	1-126-916-11	ELECT	1000uF	20%	6.3V
C258	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C259	1-163-005-11	CERAMIC CHIP	470PF	10%	50V
C260	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C261	1-163-031-11	CERAMIC CHIP	0.01uF		50V
C263	1-124-927-11	ELECT	4.7uF	20%	100V
C266	1-124-927-11	ELECT	4.7uF	20%	100V
C267	1-124-927-11	ELECT	4.7uF	20%	100V
C269	1-124-927-11	ELECT	4.7uF	20%	100V
C270	1-126-947-11	ELECT	47uF	20%	10V
C271	1-124-927-11	ELECT	4.7uF	20%	100V
C272	1-126-947-11	ELECT	47uF	20%	10V
C273	1-124-927-11	ELECT	4.7uF	20%	100V
C282	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C283	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C284	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C285	1-163-127-00	CERAMIC CHIP	270PF	5%	50V
C286	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C287	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C350	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C351	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C401	1-124-589-11	ELECT	47uF	20%	16V
C402	1-124-589-11	ELECT	47uF	20%	16V
C403	1-124-477-11	ELECT	47uF	20%	25V
C404	1-124-477-11	ELECT	47uF	20%	25V
C405	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C406	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C407	1-126-947-11	ELECT	47uF	20%	10V
C408	1-126-947-11	ELECT	47uF	20%	10V
C410	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C411	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C412	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C413	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V
C414	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C415	1-124-282-00	ELECT	22uF	20%	16V

Ref.No.	Part No.	Description			Remark
C416	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C417	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C418	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C419	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C420	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C421	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C423	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C424	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C425	1-163-253-11	CERAMIC CHIP	120PF	5%	50V
C427	1-126-320-11	ELECT, NONPOLAR	10uF	20%	16V
C428	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C430	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C431	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C432	1-163-022-00	CERAMIC CHIP	0.012uF	10%	50V
C433	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C434	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C435	1-163-018-00	CERAMIC CHIP	0.0056uF	5%	50V
C436	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C437	1-124-273-00	ELECT	3.3uF	20%	50V
C439	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C440	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C441	1-126-320-11	ELECT, NONPOLAR	10uF	20%	16V
C443	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C444	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C445	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C447	1-163-249-11	CERAMIC CHIP	82PF	5%	50V
C448	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C449	1-109-889-11	ELECT	1uF	20%	50V
C450	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C451	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C453	1-124-903-11	ELECT	1uF	20%	50V
C454	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C455	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C456	1-163-011-11	CERAMIC CHIP	0.0015uF	10%	50V
C457	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C458	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C459	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C501	1-126-947-11	ELECT	47uF	20%	10V
C502	1-107-701-11	ELECT	47uF	20%	16V
C503	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C504	1-163-245-11	CERAMIC CHIP	56PF	5%	50V
C505	1-164-182-11	CERAMIC CHIP	0.0033uF	10%	50V
C506	1-124-927-11	ELECT	4.7uF	20%	100V
C507	1-124-768-11	ELECT	4.7uF	20%	35V
C508	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C509	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C510	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C511	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C512	1-124-477-11	ELECT	47uF	20%	25V
C513	1-163-038-91	CERAMIC CHIP	0.1uF		25V

Ref.No.	Part No.	Description			Remark
C514	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C515	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C516	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C517	1-163-038-91	CERAMIC CHIP	0.1uF		25V
C519	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C520	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C530	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
		< CONNECTOR >			
CN001	1-695-342-31	PIN, CONNECTOR (PC BOARD) 19P			
CN401	1-750-687-11	HOUSING, CONNECTOR (PC BOARD) 14P			
* CN402	1-764-594-21	CONNECTOR, FPC 18P			
CN403	1-695-335-11	PIN, CONNECTOR (PC BOARD) 12P			
CN501	1-695-330-31	PIN, CONNECTOR (PC BOARD) 7P			
* CN502	1-695-334-11	PIN, CONNECTOR (PC BOARD) 11P			
		< TRIMMER >			
CT001	1-141-442-91	TRIMMER, CERAMIC 20P			
		< DIODE >			
D001	8-719-800-76	DIODE	1SS226		
D002	8-719-988-62	DIODE	1SS355		
D110	8-719-988-62	DIODE	1SS355		
D201	8-719-988-62	DIODE	1SS355		
D202	8-719-914-43	DIODE	DAN202K		
D203	8-719-032-80	DIODE	KV1430TL00		
D204	8-719-914-42	DIODE	DA204K		
D205	8-719-914-42	DIODE	DA204K		
D401	8-719-988-62	DIODE	1SS355		
D402	8-719-914-42	DIODE	DA204K		
D403	8-719-914-43	DIODE	DAN202K		
D404	8-719-914-44	DIODE	DAP202K		
D405	8-719-976-91	DIODE	DTZ4.3B		
D501	8-719-988-62	DIODE	1SS355		
D503	8-719-988-62	DIODE	1SS355		
D504	8-719-977-34	DIODE	DTZ12		
D505	8-719-914-44	DIODE	DAP202K		
		< FERRITE BEAD >			
FB501	1-414-135-11	INDUCTOR CHIP 0uH			
		< FILTER >			
FL001	1-577-543-11	FILTER, CERAMIC			
FL002	1-577-543-11	FILTER, CERAMIC			
FL201	1-236-744-21	EMI FILTER			
FL202	1-236-744-21	EMI FILTER			

MB-717

Ref. No.	Part No.	Description	Remark
		< IC >	
IC001	8-759-299-92	IC AN2661NK (FM DEMOD, DO DET, SYNC SEP)	
IC002	8-759-299-91	IC M35012-092SP (CHARACTER GENERATORMIX)(EXCEPT TW)	
IC002	8-759-327-19	IC M35012-095SP (CHARACTER GENERATORMIX)(TW)	
IC003	8-759-290-65	IC MN8811 (A/D, D/A, TBC, DOC)	
IC004	8-759-295-66	IC BA7653AF-E2 (PB VIDEO/GRAY BACK SELECTOR)	
IC005	8-759-164-18	IC MM1118XFF (VIDEO MUTE)	
IC201	8-752-372-94	IC CXD2507AQ (AUDIO D.S.P)	
IC203	8-759-253-26	IC CA0002AM-TP (AFM DEMOD CX NR)	
IC204	8-759-100-96	IC XRA4558F-E2 (CD SPINDLE ERROR AMP)	
IC205	8-759-263-31	IC TC9293FN-EL (DIGIFIL & DAC)	
IC206	8-759-100-96	IC XRA4558F-E2 (BUFFER)	
IC401	8-759-280-89	IC HA11529F (SERVO)	
⚠IC402	8-759-822-38	IC LA6510 (TILT MOTOR DRIVE)	
⚠IC403	8-759-100-96	IC XRA4558F-E2 (TRACKING COIL DRIVE/FOCUS COIL DRIVE)	
IC404	8-759-100-96	IC XRA4558F-E2 (AMP)	
IC405	8-759-100-96	IC XRA4558F-E2 (TILT AMP)	
IC406	8-759-100-96	IC XRA4558F-E2 (AMP/TILT CONTROL AMP)	
IC407	8-759-932-67	IC BU4053BCF (TILT LIMIT CTR SWITCH, TILT A/B SELECT SWITCH, CD/LD/CDV SELECT SWITCH)	
IC501	8-759-293-56	IC MB89094PF-G-131-BND(SYSTEM CONTROL)	
IC502	8-759-294-47	IC MBCG24692-4425 (SYSTEM CONTROL)	
IC503	8-759-231-92	IC TA7291P (LOADING MOTOR DRIVE)	
IC504	8-759-060-00	IC BA10324AF-E2 (ERROR AMP, PHASE COMPENSTATION, AMP)	
IC505	8-759-932-65	IC BU4052BCF (SPINDLE ERROR SIGNAL SELECT (LC/CD/CDV))	
IC506	8-759-932-67	IC BU4053BCF (LD SPDL ERROR AMP)	
		< JACK >	
J202	1-764-592-11	JACK 3P	
J203	1-764-592-11	JACK 3P	
		< JUMPER RESISTOR >	
JR001	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR002	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR003	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR004	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR005	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR006	1-216-295-00	METAL CHIP 0 5% 1/10W	
JR007	1-216-295-00	METAL CHIP 0 5% 1/10W	

Ref. No.	Part No.	Description	Remark
		< COIL >	
L001	1-408-970-21	INDUCTOR 10uH	
L002	1-408-970-21	INDUCTOR 10uH	
L003	1-408-970-21	INDUCTOR 10uH	
L004	1-408-970-21	INDUCTOR 10uH	
L005	1-408-973-21	INDUCTOR 18uH	
L006	1-408-970-21	INDUCTOR 10uH	
L007	1-408-974-21	INDUCTOR 22uH	
L008	1-408-973-21	INDUCTOR 18uH	
L009	1-408-973-21	INDUCTOR 18uH	
L010	1-408-968-21	INDUCTOR 6.8uH	
L011	1-408-968-21	INDUCTOR 6.8uH	
L012	1-408-974-21	INDUCTOR 22uH	
L013	1-408-976-21	INDUCTOR 33uH	
L014	1-408-976-21	INDUCTOR 33uH	
L015	1-408-975-21	INDUCTOR 27uH	
L016	1-408-970-21	INDUCTOR 10uH	
L017	1-408-975-21	INDUCTOR 27uH	
L018	1-408-970-21	INDUCTOR 10uH	
L019	1-408-970-21	INDUCTOR 10uH	
L020	1-408-970-21	INDUCTOR 10uH	
L021	1-408-970-21	INDUCTOR 10uH	
L022	1-408-974-21	INDUCTOR 22uH	
L023	1-408-962-21	INDUCTOR 2.2uH	
L024	1-408-974-21	INDUCTOR 22uH	
L025	1-408-970-21	INDUCTOR 10uH	
L026	1-408-975-21	INDUCTOR 27uH	
L027	1-408-970-21	INDUCTOR 10uH	
L028	1-408-970-21	INDUCTOR 10uH	
L201	1-408-982-11	INDUCTOR 100uH	
L202	1-408-979-21	INDUCTOR 56uH	
L203	1-408-978-21	INDUCTOR 47uH	
L204	1-408-973-21	INDUCTOR 18uH	
L205	1-408-985-21	INDUCTOR 180uH	
L209	1-414-161-21	INDUCTOR 1mH	
L210	1-414-161-21	INDUCTOR 1mH	
L401	1-408-970-21	INDUCTOR 10uH	
L402	1-408-970-21	INDUCTOR 10uH	
L404	1-408-983-21	INDUCTOR 120uH	
L405	1-408-983-21	INDUCTOR 120uH	
L406	1-408-970-21	INDUCTOR 10uH	
L407	1-408-970-21	INDUCTOR 10uH	
L501	1-408-970-21	INDUCTOR 10uH	
L504	1-408-970-21	INDUCTOR 10uH	
		< TRANSISTOR >	
Q001	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q002	8-729-027-43	TRANSISTOR DTC114EKA-T146	
Q003	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q004	8-729-120-28	TRANSISTOR 2SC1623-L5L6	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description		Remark
Q007	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q009	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q011	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q012	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q013	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q014	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q015	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q016	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q017	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q019	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q020	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q021	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q022	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q023	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q024	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q025	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q026	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q027	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q028	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q030	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q201	8-729-027-43	TRANSISTOR	DTC114EKA-T146	
Q202	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q203	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q204	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q205	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q206	8-729-027-23	TRANSISTOR	DTA114EKA-T146	
Q207	8-729-027-44	TRANSISTOR	DTC114TKA-T146	
Q210	8-729-023-22	TRANSISTOR	2SD2114K	
Q211	8-729-023-22	TRANSISTOR	2SD2114K	
⚠Q401	8-729-209-15	TRANSISTOR	2SD2012	
⚠Q402	8-729-024-95	TRANSISTOR	2SB1565EF	
⚠Q403	8-729-209-15	TRANSISTOR	2SD2012	
⚠Q404	8-729-024-95	TRANSISTOR	2SB1565EF	
Q405	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q406	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q407	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q408	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q409	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q410	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q411	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q412	8-729-027-52	TRANSISTOR	DTC124EKA-T146	
Q413	8-729-027-31	TRANSISTOR	DTA124EKA-T146	
Q414	8-729-027-31	TRANSISTOR	DTA124EKA-T146	
Q415	8-729-027-31	TRANSISTOR	DTA124EKA-T146	
Q416	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q417	8-729-120-28	TRANSISTOR	2SC1623-L5L6	
Q418	8-729-027-31	TRANSISTOR	DTA124EKA-T146	
Q501	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	
Q502	8-729-026-50	TRANSISTOR	2SA1037AK-T146-QR	

Ref.No.	Part No.	Description				Remark
		< RESISTOR >				
R001	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R002	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R003	1-216-041-00	METAL CHIP	470	5%	1/10W	
R004	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R005	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R006	1-216-021-00	METAL CHIP	68	5%	1/10W	
R007	1-216-035-00	METAL CHIP	270	5%	1/10W	
R008	1-216-047-00	METAL CHIP	820	5%	1/10W	
R009	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R010	1-216-037-00	METAL CHIP	330	5%	1/10W	
R011	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R012	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R014	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R015	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R016	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R017	1-216-043-00	METAL CHIP	560	5%	1/10W	
R018	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R019	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R020	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R021	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R022	1-216-041-00	METAL CHIP	470	5%	1/10W	
R023	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R025	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R027	1-216-119-00	METAL CHIP	820K	5%	1/10W	
R032	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R033	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R034	1-216-045-00	METAL CHIP	680	5%	1/10W	
R035	1-216-039-00	METAL CHIP	390	5%	1/10W	
R036	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R037	1-216-295-00	METAL CHIP	0	5%	1/10W	
R038	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R039	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R040	1-216-043-00	METAL CHIP	560	5%	1/10W	
R042	1-216-029-00	METAL CHIP	150	5%	1/10W	
R043	1-216-041-00	METAL CHIP	470	5%	1/10W	
R044	1-216-041-00	METAL CHIP	470	5%	1/10W	
R045	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R046	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R047	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R048	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R049	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R050	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R051	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R052	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R053	1-216-043-00	METAL CHIP	560	5%	1/10W	
R054	1-216-041-00	METAL CHIP	470	5%	1/10W	
R055	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R056	1-216-039-00	METAL CHIP	390	5%	1/10W	
R059	1-216-043-00	METAL CHIP	560	5%	1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MB-717

Ref. No.	Part No.	Description				Remark
R061	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R062	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R063	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R064	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R065	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R066	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R067	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R068	1-216-025-00	METAL CHIP	100	5%	1/10W	
R069	1-216-037-00	METAL CHIP	330	5%	1/10W	
R070	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R071	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R072	1-216-033-00	METAL CHIP	220	5%	1/10W	
R073	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R074	1-216-025-00	METAL CHIP	100	5%	1/10W	
R075	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R076	1-216-295-00	METAL CHIP	0	5%	1/10W	
R077	1-216-041-00	METAL CHIP	470	5%	1/10W	
R078	1-216-025-00	METAL CHIP	100	5%	1/10W	
R079	1-216-041-00	METAL CHIP	470	5%	1/10W	
R080	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R081	1-216-021-00	METAL CHIP	68	5%	1/10W	
R082	1-216-041-00	METAL CHIP	470	5%	1/10W	
R083	1-216-043-00	METAL CHIP	560	5%	1/10W	
R084	1-216-041-00	METAL CHIP	470	5%	1/10W	
R085	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R086	1-216-021-00	METAL CHIP	68	5%	1/10W	
R088	1-216-295-00	METAL CHIP	0	5%	1/10W	
R089	1-216-033-00	METAL CHIP	220	5%	1/10W	
R090	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R091	1-216-058-00	METAL GLAZE	2.4K	5%	1/10W	
R093	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R094	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R095	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R097	1-216-295-00	METAL CHIP	0	5%	1/10W	
R098	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R099	1-216-037-00	METAL CHIP	330	5%	1/10W	
R110	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R111	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R112	1-216-295-00	METAL CHIP	0	5%	1/10W	
R113	1-216-037-00	METAL CHIP	330	5%	1/10W	
R119	1-216-047-00	METAL CHIP	820	5%	1/10W	
R120	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R121	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R122	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R123	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R124	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R125	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R126	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R127	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R128	1-216-029-00	METAL CHIP	150	5%	1/10W	
R129	1-216-033-00	METAL CHIP	220	5%	1/10W	
R130	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R200	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R203	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R204	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R205	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R206	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R207	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R208	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R209	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R210	1-216-041-00	METAL CHIP	470	5%	1/10W	
R211	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R212	1-216-017-00	METAL CHIP	47	5%	1/10W	
R213	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R214	1-216-023-00	METAL CHIP	82	5%	1/10W	
R215	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R216	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R217	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R218	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R219	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R220	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R222	1-216-295-00	METAL CHIP	0	5%	1/10W	
R223	1-216-295-00	METAL CHIP	0	5%	1/10W	
R224	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R226	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R227	1-216-074-00	METAL CHIP	11K	5%	1/10W	
R228	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R230	1-216-295-00	METAL CHIP	0	5%	1/10W	
R231	1-216-295-00	METAL CHIP	0	5%	1/10W	
R232	1-216-043-00	METAL CHIP	560	5%	1/10W	
R233	1-216-295-00	METAL CHIP	0	5%	1/10W	
R235	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R236	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R237	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R238	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R239	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R240	1-216-096-00	METAL GLAZE	91K	5%	1/10W	
R242	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R243	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R245	1-216-104-00	METAL CHIP	200K	5%	1/10W	
R246	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R247	1-216-043-00	METAL CHIP	560	5%	1/10W	
R248	1-216-043-00	METAL CHIP	560	5%	1/10W	
R250	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R251	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R252	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R254	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R255	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R256	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R257	1-216-073-00	METAL CHIP	10K	5%	1/10W	

Ref.No.	Part No.	Description				Remark
R258	1-216-104-00	METAL CHIP	200K	5%	1/10W	
R260	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R261	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R262	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R263	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R264	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R265	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R266	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R268	1-216-295-00	METAL CHIP	0	5%	1/10W	
R270	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R271	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R272	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R273	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R279	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R281	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R282	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R283	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R286	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R287	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R288	1-216-295-00	METAL CHIP	0	5%	1/10W	
R289	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R290	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R291	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R292	1-216-043-00	METAL CHIP	560	5%	1/10W	
R295	1-216-043-00	METAL CHIP	560	5%	1/10W	
R300	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R301	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R302	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R303	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R307	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R308	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R309	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R311	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R323	1-216-033-00	METAL CHIP	220	5%	1/10W	
R324	1-216-033-00	METAL CHIP	220	5%	1/10W	
R351	1-216-295-00	METAL CHIP	0	5%	1/10W	
R352	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R401	1-216-369-00	METAL OXIDE	1	5%	2W	F
R402	1-216-146-00	METAL GLAZE	6.8	5%	1/8W	
R403	1-216-146-00	METAL GLAZE	6.8	5%	1/8W	
R404	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R405	1-216-025-00	METAL CHIP	100	5%	1/10W	
R406	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R407	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R408	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R409	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R411	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R412	1-216-045-00	METAL CHIP	680	5%	1/10W	
R413	1-216-047-00	METAL CHIP	820	5%	1/10W	
R414	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R415	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R416	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R417	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R418	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R419	1-216-045-00	METAL CHIP	680	5%	1/10W	
R420	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R421	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R422	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R423	1-216-039-00	METAL CHIP	390	5%	1/10W	
R424	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R425	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R426	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R427	1-216-017-00	METAL CHIP	47	5%	1/10W	
R428	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R429	1-216-689-11	METAL CHIP	39K	0.5%	1/10W	
R430	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R431	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R432	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R433	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R434	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R435	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R436	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R437	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R438	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R442	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R444	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R445	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R446	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R447	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R448	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R449	1-216-035-00	METAL CHIP	270	5%	1/10W	
R450	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R451	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R452	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R453	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R454	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R455	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R456	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R457	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R458	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R459	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R460	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R461	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R462	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R463	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R464	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R465	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R466	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R467	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R468	1-216-089-00	METAL CHIP	47K	5%	1/10W	

MB-717

Ref.No.	Part No.	Description				Remark	Ref.No.	Part No.	Description				Remark
R469	1-216-049-00	METAL CHIP	1K	5%	1/10W		R522	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R470	1-216-081-00	METAL CHIP	22K	5%	1/10W		R523	1-216-035-00	METAL CHIP	270	5%	1/10W	
R471	1-216-079-00	METAL CHIP	18K	5%	1/10W		R524	1-208-810-11	METAL GLAZE	15K	0.50%	1/10W	
R472	1-216-049-00	METAL CHIP	1K	5%	1/10W		R525	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R473	1-216-075-00	METAL CHIP	12K	5%	1/10W		R526	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R474	1-216-093-00	METAL CHIP	68K	5%	1/10W		R527	1-216-033-00	METAL CHIP	220	5%	1/10W	
R475	1-216-099-00	METAL CHIP	120K	5%	1/10W		R528	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R476	1-216-073-00	METAL CHIP	10K	5%	1/10W		R530	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R477	1-216-077-00	METAL CHIP	15K	5%	1/10W		R531	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R478	1-216-689-11	METAL CHIP	39K	0.5%	1/10W		R532	1-216-045-00	METAL CHIP	680	5%	1/10W	
R479	1-216-085-00	METAL CHIP	33K	5%	1/10W		R533	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R480	1-216-073-00	METAL CHIP	10K	5%	1/10W		R534	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R481	1-216-069-00	METAL CHIP	6.8K	5%	1/10W		R535	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R482	1-216-049-00	METAL CHIP	1K	5%	1/10W		R536	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R483	1-216-073-00	METAL CHIP	10K	5%	1/10W		R537	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R484	1-216-091-00	METAL CHIP	56K	5%	1/10W		R538	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R485	1-216-053-00	METAL CHIP	1.5K	5%	1/10W		R539	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R486	1-216-073-00	METAL CHIP	10K	5%	1/10W		R540	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R487	1-216-079-00	METAL CHIP	18K	5%	1/10W		R541	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R488	1-216-089-00	METAL CHIP	47K	5%	1/10W		R542	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R489	1-216-061-00	METAL CHIP	3.3K	5%	1/10W		R543	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R490	1-216-073-00	METAL CHIP	10K	5%	1/10W		⚠R544	1-212-950-00	FUSIBLE	4.7	5%	1/2W	F
R491	1-216-069-00	METAL CHIP	6.8K	5%	1/10W		R545	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R492	1-216-073-00	METAL CHIP	10K	5%	1/10W		R546	1-216-045-00	METAL CHIP	680	5%	1/10W	
R493	1-216-689-11	METAL CHIP	39K	0.5%	1/10W		R547	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R494	1-216-105-00	METAL CHIP	220K	5%	1/10W		R548	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R495	1-216-085-00	METAL CHIP	33K	5%	1/10W		R549	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R496	1-216-097-00	METAL CHIP	100K	5%	1/10W		R550	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R497	1-216-085-00	METAL CHIP	33K	5%	1/10W		R551	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R498	1-216-689-11	METAL CHIP	39K	0.5%	1/10W		R552	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R499	1-216-093-00	METAL CHIP	68K	5%	1/10W		R555	1-216-021-00	METAL CHIP	68	5%	1/10W	
R502	1-216-089-00	METAL CHIP	47K	5%	1/10W		R556	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R503	1-216-049-00	METAL CHIP	1K	5%	1/10W		R557	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R504	1-216-033-00	METAL CHIP	220	5%	1/10W		R558	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R506	1-216-121-00	METAL CHIP	1M	5%	1/10W		R559	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R507	1-216-049-00	METAL CHIP	1K	5%	1/10W		R560	1-216-033-00	METAL CHIP	220	5%	1/10W	
R508	1-208-816-11	METAL GLAZE	27K	0.50%	1/10W		R561	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R509	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W		R562	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R510	1-216-089-00	METAL CHIP	47K	5%	1/10W		R563	1-216-033-00	METAL CHIP	220	5%	1/10W	
R511	1-216-111-00	METAL CHIP	390K	5%	1/10W		R564	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R512	1-216-113-00	METAL CHIP	470K	5%	1/10W		R565	1-216-033-00	METAL CHIP	220	5%	1/10W	
R513	1-208-838-11	METAL GLAZE	220K	0.50%	1/10W		R566	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R514	1-208-830-11	METAL GLAZE	100K	0.50%	1/10W		R567	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R515	1-216-077-00	METAL CHIP	15K	5%	1/10W		R568	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R516	1-216-085-00	METAL CHIP	33K	5%	1/10W		R569	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R517	1-208-808-11	METAL GLAZE	12K	0.50%	1/10W		R570	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R518	1-208-806-11	METAL GLAZE	10K	0.50%	1/10W		R571	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R519	1-208-818-11	METAL GLAZE	33K	0.50%	1/10W		R572	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R520	1-216-073-00	METAL CHIP	10K	5%	1/10W		R573	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R521	1-208-844-11	METAL GLAZE	390K	0.50%	1/10W		R574	1-216-049-00	METAL CHIP	1K	5%	1/10W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref.No.	Part No.	Description				Remark
R576	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R577	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R578	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R595	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R596	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R597	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R900	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R901	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R902	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R903	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R904	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R905	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R906	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R907	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R908	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R910	1-216-295-00	METAL CHIP	0	5%	1/10W	
R911	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R912	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R913	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R914	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R915	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R916	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R917	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R918	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R919	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R920	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R921	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R922	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R923	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R924	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R925	1-216-017-00	METAL CHIP	47	5%	1/10W	
R926	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R927	1-216-003-11	METAL GLAZE	12	5%	1/10W	
R928	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R929	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R930	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R931	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R932	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R933	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R935	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R936	1-216-031-00	METAL CHIP	180	5%	1/10W	
R937	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R939	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R944	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R945	1-216-049-00	METAL CHIP	1K	5%	1/10W	

< VARIABLE RESISTOR >

Ref.No.	Part No.	Description	Remark
RV001	1-223-236-11	RES, ADJ, CARBON 1K	
RV401	1-223-241-11	RES, ADJ, CARBON 47K	
RV402	1-223-241-11	RES, ADJ, CARBON 47K	

< VIBRATOR >

Ref.No.	Part No.	Description	Remark
X001	1-760-541-21	VIBRATOR, CRYSTAL (28.125MHz)	
X201	1-567-515-11	VIBRATOR, VARIABLE CRYSTAL (16.9344MHz)	

****

* A-6423-230-A MD-705 BOARD, COMPLETE
****
(Ref.No. 2,000 Series)

3-953-262-01 HOLDER, LED

< CONNECTOR >

Ref.No.	Part No.	Description	Remark
CN431	1-695-335-11	PIN, CONNECTOR (PC BOARD) 12P	
CN432	1-691-036-21	HOUSING, CONNECTOR 4P	
CN433	1-766-938-11	CONNECTOR, BOARD TO BOARD 5P	
* CN434	1-564-014-51	PIN, CONNECTOR 4P	

< DIODE >

Ref.No.	Part No.	Description	Remark
D431	8-719-912-39	LED SLR932A	

< JUMPER RESISTOR >

Ref.No.	Part No.	Description				Remark
JR431	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR432	1-216-295-00	METAL CHIP	0	5%	1/10W	
JR433	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR434	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR435	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR436	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR437	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR438	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR439	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR440	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR441	1-216-296-00	METAL CHIP	0	5%	1/8W	
JR442	1-216-295-00	METAL CHIP	0	5%	1/10W	

< PHOTO INTERUPTER >

Ref.No.	Part No.	Description	Remark
PH431	8-729-020-74	DIODE GP1S24	
PH432	8-729-020-74	DIODE GP1S24	

< RESISTOR >

Ref.No.	Part No.	Description				Remark
R431	1-216-039-00	METAL CHIP	390	5%	1/10W	
R432	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R433	1-216-248-00	METAL GLAZE	120K	5%	1/8W	
R436	1-216-295-00	METAL CHIP	0	5%	1/10W	

< SWITCH >

Ref.No.	Part No.	Description	Remark
S431	1-692-440-11	SWITCH, PUSH (TILT LIMIT/TILT CENTER)	

****

MT-706 MT-707 PW-717 SW-732

Ref.No.	Part No.	Description	Remark
*	A-6423-229-A	MT-706 BOARD, COMPLETE	
		***********************	
		(Ref.No. 2,000 Series)	
		< CONNECTOR >	
CN421	1-766-937-11	CONNECTOR, BOARD TO BOARD 5P	
		< MOTOR >	
M421	1-541-930-11	MOTOR, DC (TILT)	

****

Ref.No.	Part No.	Description	Remark
*	1-654-464-11	MT-707 BOARD (Ref.No. 4,000 Series)	
		***********	
		< CAPACITOR >	
C481	1-163-038-91	CERAMIC CHIP 0.1uF 25V	
		< CONNECTOR >	
* CN481	1-569-666-11	PIN, CONNECTOR (PC BOARD) 5P	
CN482	1-695-368-31	PIN, CONNECTOR (PC BOARD) 7P	
		< MOTOR >	
M481	1-541-309-11	MOTOR, L (RF-370C)(LOADING)	

****

Ref.No.	Part No.	Description	Remark
*	A-6423-235-A	PW-717 BOARD, COMPLETE	
		***********************	
		(Ref.No. 3,000 Series)	
		< CAPACITOR >	
C201	1-164-232-11	CERAMIC CHIP 0.01uF 50V	
		< CONNECTOR >	
CN201	1-691-066-21	HOUSING, CONNECTOR 7P	
		< DIODE >	
D201	8-719-955-04	DIODE PY5504S-1 (▶)	
D202	8-719-981-49	DIODE GL3ED8 (EXCEPT TW)	
D203	8-719-992-30	LED SLR305MC3F (TW)	
		< IC >	
IC201	8-741-810-59	IC ELEMENT, RAY-CATCHER SBX1810-59 (REMOTE CONTROL RECEIVER)	
		< TRANSISTOR >	
Q201	8-729-027-31	TRANSISTOR DTA124EKA-T146	
Q202	8-729-027-31	TRANSISTOR DTA124EKA-T146 (EXCEPT TW)	
		< RESISTOR >	
R201	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R202	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R203	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R204	1-216-081-00	METAL CHIP 22K 5% 1/10W	
R205	1-216-037-00	METAL CHIP 330 5% 1/10W	
R206	1-216-178-00	METAL GLAZE 150 5% 1/8W	(EXCEPT TW)
R206	1-216-182-00	METAL GLAZE 220 5% 1/8W	(TW)
R207	1-216-059-00	METAL CHIP 2.7K 5% 1/10W	
R208	1-216-186-00	METAL GLAZE 330 5% 1/8W	(EXCEPT TW)
R209	1-216-063-00	METAL CHIP 3.9K 5% 1/10W	
R210	1-216-071-00	METAL CHIP 8.2K 5% 1/10W	
R211	1-216-295-00	METAL CHIP 0 5% 1/10W	(TW)
		< SWITCH >	
S201	1-572-946-31	SWITCH, TACTIL (■)	
S202	1-572-946-31	SWITCH, TACTIL (❚❚)	
S203	1-572-946-31	SWITCH, TACTIL (SIDE A)	
S204	1-572-946-31	SWITCH, TACTIL (SIDE B)	
S205	1-572-946-31	SWITCH, TACTIL (▶)	
S206	1-572-946-31	SWITCH, TACTIL (POWER)	
S207	1-572-946-31	SWITCH, TACTIL (OPEN/CLOSE ⏏)	
S208	1-572-946-31	SWITCH, TACTIL (ACS/AMS |◀◀)	
S209	1-572-946-31	SWITCH, TACTIL (ACS/AMS ▶▶|)	

****

Ref.No.	Part No.	Description	Remark
*	A-6423-236-A	SW-732 BOARD, COMPLETE	
		*********************	
		(Ref.No. 4,000 Series)	
		< CONNECTOR >	
* CN461	1-565-042-11	HOUSING, CONNECTOR (PC BOARD) 5P	
		< JUMPER RESISTOR >	
JR461	1-216-296-00	METAL CHIP 0 5% 1/8W	
JR462	1-216-296-00	METAL CHIP 0 5% 1/8W	
		< PHOTO INTERUPTER >	
PH461	8-729-020-74	DIODE GP1S24	
PH462	8-729-020-74	DIODE GP1S24	
PH463	8-729-020-74	DIODE GP1S24	
		< RESISTOR >	
R461	1-216-194-00	METAL CHIP 680 5% 1/8W	
R462	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R463	1-216-039-00	METAL CHIP 390 5% 1/10W	
R464	1-216-099-00	METAL CHIP 120K 5% 1/10W	
R465	1-216-248-00	METAL GLAZE 120K 5% 1/8W	

****

MISCELLANEOUS
****

Ref. No.	Part No.	Description	Remark
17	1-769-150-11	FLAT CABLE (FFP-001)(7 CORE)	
62	1-769-148-11	FLAT CABLE (FMM-001)(7 CORE)	
63	1-769-149-11	FLAT CABLE (FUF-002)(11 CORE)	
64	1-769-147-11	FLAT CABLE (FMD-003)(12 CORE)	
65	1-769-146-11	FLAT CABLE (FMP-002)(19 CORE)	
⚠*68	1-769-500-11	CORD, POWER (TW)	
⚠68	1-575-912-21	CORD, POWER (EXCEPT TW)	
⚠117	1-413-989-11	POWER BLOCK (EXCEPT TW)	
⚠117	————	POWER BLOCK (TW)	
⚠168	8-848-286-11	DEVICE, OPTICAL KHS-150A(S)	
170	1-751-083-11	CABLE, FLEXIBLE FLAT (18 CORE)	
172	1-769-151-11	FLAT CABLE (FMB-001)(4 CORE)	
M421	1-541-930-11	MOTOR, DC (TILT)	
M481	X-3944-685-1	MOTOR ASSY, LOADING (RF-370C)	
M901	1-698-109-11	MOTOR, DD (SPINDLE)	

Note:The parts No. of ref. No.117
is shown in the supplement.

****

ACCESSORIES & PACKING MATERIALS
****

Ref. No.	Part No.	Description	Remark
	1-569-008-11	ADAPTER, CONVERSION 2P(EXCEPT TW)	
	1-575-334-11	CORD, CONNECTION (A/V connecting cable (Stereo) 1.5M)	
	3-759-585-11	MANUAL, INSTRUCTION (ENGLISH, SPANISH, CHINESE)(EXCEPT TW)	
	3-759-585-41	MANUAL, INSTRUCTION (CHINESE)(TW)	
*	3-961-118-01	CUSHION (UPPER)	
*	3-961-119-01	CUSHION (LOWER)	
*	3-962-293-01	INDIVIDUAL CARTON (TW)	
	A-6772-990-A	REMOTE CONTROL COMPLETE ASSY (EXCEPT TW)	
*	A-6778-030-A	REMOTE CONTROL COMPLETE ASSY (TW)	
*	X-3944-710-1	INDIVIDUAL CARTON ASSY (EXCEPT TW)	

****

****
HARDWARE LIST
****

Ref. No.	Part No.	Description	Remark
#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3	
#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3	
#3	7-685-645-79	SCREW +BVTP 3X6 TYPE2 IT-3	
#4	7-624-105-04	STOP RING 2.3, TYPE -E	
#5	7-671-155-01	STEEL BALL 3.0	
#6	7-685-133-19	+PTP 2.6X6	
#7	7-685-103-19	SCREW +P 2X5 TYPE2 SLIT	
#8	7-621-759-65	+PSW, 2.6X8	
#9	7-628-253-05	SCREW +PS 2X4	
#10	7-682-946-09	SCREW +PSW 3X5	
#11	7-623-210-22	SW 4, TYPE 2	
#12	7-624-190-81	STOP RING 2, TYPE-CS	
#13	7-621-759-35	+PSW, 2.6X5	
#14	7-684-220-02	NUT 3, HEXAGON CAP	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

SECTION 6.
IC PIN DESCRIPTION

6-1. Terminal Function of System Control Microcomputer (IC501: MB89094 on the MB-717 Board)

Pin No.	Pin Name	I/O	Function
1	—	O	Not used. (Open)
2	CLK32	I	Clock input (2FH 31.5kHz).
3	GND	—	GND.
4	GND	—	GND.
5	2FSC	I	Clock input (2FSC 7.16MHz).
6		O	Not used. (Open)
7	Vss	—	GND.
8	XMRST	I	Reset signal input. Reset: "L".
9	XFREQ	I	Frame No. data Reading availability information.
10	FQ ACK	O	Frame No. and sub Q data output control signal.
11	FQ SEL	O	Frame No. / Sub Q data change signal.
12	JPCTL	O	Track jump change signal. {TJ:"H", MTJ: "L".
13	SP LOCK	I	Spindle lock detection.
14	TBC HOLD IN	O	TBC Mute control.
15	SCOR	I	Sub code SYNC detection.
16	XPBV	I	PB V-sync.
17	XREFV	I	REF V-sync.
18	A LT	O	System control IC internal A-register latch.
19	B LT	O	System control IC internal B-register latch.
20	XBUSY	I	Communication control of the mode control microcomputer.
21	DOP	I	Not used.
22	VTM	I	Not used.
23	FLAG	I	Not used.
24	CDG MODE	I	Not used.
25	CLS CS	O	Clear scan data reading clock control.
26	SPDL PLS	O	Acceleration-deceleration control of the spindle.
27	CLT	O	System control IC C-register latch.
28	CMOD	I	+5V pull up.
29	CLS DT	I	Interval data between PB V and REF V.
30	SET DT	O	Serial data.
31	SET CK	O	Serial clock.
32	SPDL FG1	I	Spindle FG1.
33	G MUTE	I	Gray picture control when CLV scanning.
34	LD SEARCH	O	Spindle control when LD searching.
35	SPDL F/R	O	Spindle control.
36	CDG CONT	O	Video switching control, always "L".
37	1 TJ	O	Trigger of 1 track jumping.
38	MWE	O	Not used.
39	MEM/XTHR	O	Not used.
40	MSTAT	O	Not used.

Pin No.	Pin Name	I/O	Function
41	MTJ	O	Multi track jumping control.
42	MTF ON/XOFF	O	MTF correction ON/OFF control.
43	V LOAD	O	Video IC data load.
44	—	—	Not used. (Open)
45	PM OFF	O	Velocity error ON/OFF
46	—	—	Not used. (Open)
47	BLK LEVEL	O	Not used.
48	XFL	I	Focus lock. Lock: "L"
49	Vcc	—	+5v power supply.
50	LINE SEL	I	Communication control of the mode control microcomputer.
51	XCDG MUTE	O	Not used.
52	TILT UP	O	Tilt drive control.
53	TILT DOWN	O	Tilt drive control.
54	XMMI CS	O	Communication control of mode control microcomputer.
55	LOADING	O	Tray and chucking drive control.
56	UN LOADING	O	Tray and chucking drive control.
57	XCDG RST	O	Not used.
58	Vss	—	GND.
59	LINE MUTE	O	Audio line output mute. MUTE: "L".
60	$\overline{\text{DIGITAL O MUTE}}$	I	Digital O mute detection.
61	MC RST	O	Reset output of the system control microcomputer.
62	LD ON	O	Laser diode ON/OFF control of optical pickup. Lighted: "H".
63	XCD/LDCDV	O	Disc mode change. CD: "L", LD/CDV: "H".
64	XSV LT	O	Servo IC data latch.
65	SIDE A/XB	O	Disc side change. Side B: "L"
66	BRK INH	O	Tracking servo brake control.
67	LC SW1	I	Loading cam sensor 1.
68	XLD LED	O	LED lighted control for the disc sensor. Lighted: "L"
69	LC SW2	I	Loading cam sensor 2.
70	LC SW3	I	Loading cam sensor 3.
71	(SPDL FG2)	I	Not used.
72	TILT LIMIT	I	Tilt switch. Limit position detection.
73	TILT CTR	I	Tilt switch. Center position detection.
74	MECH SI	I	Communication data input with the mode control microcomputer.
75	—	—	Not used. (Open)
76	—	—	Not used. (Open)
77	MECH SI	I	Communication data input with mode control microcomputer.
78	MECH SO	O	Communication data output with mode control microcomputer.
79	MECH CLK	I/O	System control microcomputer communication clock.
80	T CNT	I	Traverse count.

6-2. Terminal Function of System Control IC (IC502: MBCG24692-4425 on the MB-717 Board)

Pin No.	Pin Name	I/O	Function
1	AUXO	O	Audio BIT CLOCK reverse output.
2	AUXI	I	Audio BIT CLOCK input.
3	VDD	—	+5V power supply.
4	GND	—	GND.
5	PCD1	O	Not used. (Open)
6	XPHS	O	
7	HS	O	
8	DOC INH	O	
9	REF HC	O	
10	REF HE	O	
11	HMSK	O	
12	FH4	O	
13	SYEX	O	
14	FSC	O	
15	GND	I	GND.
16	XIN	I	Clock input. 4 Fsc=14.13MHz.
17	XOUT	O	Clock output.
18	VMUTE1	O	Playback V-sync delete signal when CLV scanning.
19	VMUTE2	O	Reference V-sync additional signal when CLV scanning.
20	VMUTE	O	Not used. (Open)
21	GBURST	O	Gray picture signal when CLV scanning.
22	DLRH	O	
23	GRH	O	
24	ME REFH	O	Not used. (Open)
25	XCD/LD CDV	O	
26	GVID	I	CLV scan gray picture control signal.
27	TBCH	I	Not used. (Open)
28	VDD	—	+5V power supply.
29	GND	—	GND.
30	DS GATE	O	Philips code gate signal.
31	TBC REFH	O	Standard H-sync signal for TBC.
32	PBCS	I	Playback composite sync signal.
33	P CODE	I	Philips code input.
34	JMP TGL	O	Jump toggle signal.
35	TBC MUTE	O	TBC mute signal.
36	CONT2	O	TBC control signal. "H": line, "L": burst channel.
37	CGV	O	Not used. (Open)
38	CGH	O	
39	HD	I	
40	GND	—	GND.

<table>
<tr><th>Pin No.</th><th>Pin Name</th><th>I/O</th><th>Function</th></tr>
<tr><td>81</td><td>—</td><td>—</td><td>Not used. (Open)</td></tr>
<tr><td>82</td><td>—</td><td>—</td><td>Not used. (Open)</td></tr>
<tr><td>83</td><td>Vss</td><td>—</td><td>GND.</td></tr>
<tr><td>84</td><td>LD DET</td><td>I</td><td>LD disc size detection. 12inch LD: 5V when the disc detected, 8inch LD: 2.5V when the disc detected, CD or no disc: 0V when the disc detected.</td></tr>
<tr><td>85</td><td>CD/ALD</td><td>I</td><td>Thread position detection.</td></tr>
<tr><td>86</td><td>CDV/BLD</td><td>I</td><td>Thread position detection.</td></tr>
<tr><td>87</td><td>TRAY IM</td><td>I</td><td>Tray motor current detection.</td></tr>
<tr><td>88</td><td>XDSP LT</td><td>O</td><td>Audio DSP data latch.</td></tr>
<tr><td>89</td><td>MUTG</td><td>O</td><td>Audio DSP mute.</td></tr>
<tr><td>90</td><td>LOCK</td><td>I</td><td>Frame sync lock detection.</td></tr>
<tr><td>91</td><td>SENSE</td><td>I</td><td>Audio DSP sense information.</td></tr>
<tr><td>92</td><td>Vcc</td><td>—</td><td>+5V power supply.</td></tr>
<tr><td>93</td><td>—</td><td>—</td><td>Not used.</td></tr>
<tr><td>94</td><td>EMPHA ON/OF</td><td>O</td><td>Emphasis ON/OFF control. Emphasis ON: "L".</td></tr>
<tr><td>95</td><td>A MUTE1</td><td>O</td><td rowspan="2">AFM audio output mode control.
<table>
<tr><th></th><th>1L</th><th>2R</th><th>1L/2L</th><th>MUTE</th></tr>
<tr><td>A MUTE 1</td><td>L</td><td>H</td><td>L</td><td>H</td></tr>
<tr><td>A MUTE 2</td><td>H</td><td>L</td><td>L</td><td>H</td></tr>
</table></td></tr>
<tr><td>96</td><td>A MUTE2</td><td>O</td></tr>
<tr><td>97</td><td>XCX</td><td>O</td><td>CX noise reduction control. CX ON: "L".</td></tr>
<tr><td>98</td><td>DIGIFIL MUTE</td><td>O</td><td>Digital filter mute. MUTE : "H".</td></tr>
<tr><td>99</td><td>XDSP SEL</td><td>O</td><td>Communication clock control to audio DSP.</td></tr>
<tr><td>100</td><td>Vcc</td><td>—</td><td>+5V power supply.</td></tr>
</table>

Pin No.	Pin Name	I/O	Function
41	CLV1	O	Not used.
42	CLV2	O	
43	8/$\overline{12}$	O	
44	PC OUT1	O	Spindle servo compulsory acceleration-deceleration output.
45	PC OUT2	O	Spindle servo H-sync mode error output.
46	SP UNLOCK	O	Mechanism control setting signal when the spindle is non-lock.
47	SP OFF	O	Output for spindle motor stop. Stop: "L".
48	HP OUT	O	Hold pulse output (for spindle servo).
49	CDV	O	Spindle mode setting. CDV-V part: "H".
50	FGMD	O	Spindle mode setting. FG mode: "H".
51	JUMP	O	Track jump control signal.
52	SV CLK	O	Clock output for servo IC.
53	V_{DD}	—	+5V power supply.
54	GND	—	GND.
55	X SET CK	O	Serial communication clock reverse output.
56	SP PBHI	I	Playback H-sync input for the spindle.
57	SP PBHO	O	Playback H-sync output for the spindle.
58	SP RHI	I	Standard H-sync input for spindle.
59	SP RHO	O	Standard H-sync output for spindle.
60	SET CLK	I	Serial communication clock input.
61	SET DT	I	Serial communication data input.
62	CLS DT	O	CLV scan V-sync counter data.
63	CLS CS	I	CLV scan data reading clock control.
64	CLT	I	Internal C-register latch.
65	GND	—	GND.
66	BLT	I	Internal B-register latch.
67	ALT	I	Internal A-register latch.
68	REFV	O	Reference V-sync signal.
69	PBV	O	Playback V-sync signal.
70	TBC HOLD IN	I	TBC mute control.
71	SP LOCK	O	Spindle servo lock detection.
72	JP CTL	I	Track jump change signal.
73	FQ SEL	I	Philips code / Sub Q data switching.
74	FQ ACK	I	Philips code / Sub Q data output control.
75	F REQ	O	Frame No. data reading possibility.
76	M RST	I	System reset.
77	FSC 2	O	2 F_{SC}=7.16MHz.
78	V_{DD}	—	+5V power supply.
79	GND	—	GND.
80	FH2	O	2 F_{H}=31.5kHz.
81	DSP SEL	I	Clock control signal for audio DSP.
82	MECH CLK	I/O	Mode control microcomputer / System control microcomputer communication clock.
83	MECH SOI	I	System control microcomputer to mode control microcomputer communication data.
84	MECH SIO	O	Mode control microcomputer to system control microcomputer communication data.
85	FQ D OUT	O	Frame No. / Sub Q data output.
86	LINE SEL	I	Between mode control microcomputer and system control microcomputer communication control.
87	MMI CLK	I	System control microcomputer to mode control microcomputer communication clock.
88	MMI SO	O	System control microcomputer to mode control microcomputer communication data.
89	MMI SI	I	Mode control microcomputer to system control microcomputer communication data.
90	GND	—	GND.
91	SUBQ CLK	O	Sub Q clock output.
92	SUB Q	I	Sub Q data input.
93	DSP CK	O	Clock output to audio DSP.
94	LRCK	I	Digital sound L/R clock input.
95	PC MD	I	Digital sound data input.
96	PC MDI	O	Digital sound data reverse output.
97	BCK INV	O	Digital sound bit clock reverse output.
98	BCK	I	Digital sound bit clock input.
99	PC SEL	I	Internal C-register select. (Open)
100	TEST	I	Test mode setting. Fixedly "L".

6-3. Terminal Function of Mode Control Microcomputer (IC102: MB89094 on the FP-740 Board)

Pin No.	Pin Name	I/O	Function
1	CL1	O	Not used. (Open)
2	CL0	I	Not used. Connected to GND.
3	GND	I	GND.
4	GND	I	GND
5	XO	I	Terminal for the crystal oscillator (8MHz).
6	X1	O	
7	GND	—	GND. terminal of power supply.
8	$\overline{\text{RESET}}$	I	Reset input terminal. "L": reset.
9	$\overline{\text{SEG B}}$	O	Segment B. "L": light. 7 segments LED drive output.
10	$\overline{\text{SEG F}}$	O	Segment F. "L": light. 7 segments LED drive output.
11	$\overline{\text{SEG A}}$	O	Segment A. "L": light. 7 segments LED drive output.
12	$\overline{\text{SEG G}}$	O	Segment G. "L": light. 7 segments LED drive output.
13	$\overline{\text{SEG C}}$	O	Segment C. "L": light. 7 segments LED drive output.
14	$\overline{\text{SEG E}}$	O	Segment E. "L": light. 7 segments LED drive output.
15	$\overline{\text{SEG D}}$	O	Segment D. "L": light. 7 segments LED drive output.
16	$\overline{\text{7 CTR}}$	O	Segment control. 7 segments LED drive output.
17	$\overline{\text{E2PBUSY}}$	I	EEPROM writing busy. "L": on writing.
18	$\overline{\text{MMI CS}}$	I	Tip select of communication with the system control microcomputer. "L": under communication.
19	$\overline{\text{REFV}}$	I	Reference V-sync signal input.
20	N.C	—	Not used. (Open)
21	N.C	—	
22	N.C	—	
23	N.C	—	
24	N.C	—	
25	N.C	—	
26	N.C	—	
27	N.C	—	
28	CMOD	I	Start mode select input after reset release. Fixedly "H".
29	SI	I	EEPROM serial transfer data input.
30	SO	O	EEPROM serial transfer data output.
31	SCK	O	EEPROM serial transfer clock output.
32	SIRCS IN	I	Sircs data input.
33	$\overline{\text{CG CS}}$	O	Character generator serial transfer chip select. "L": under communication.
34	$\overline{\text{MRST}}$	O	Reset output of system control microcomputer. "L": reset.
35	$\overline{\text{BUSY}}$	O	Busy signal for serial communication.
36	N.C	—	Not used. (Open)
37	P. CONT	O	Power ON/OFF control of the main unit. "H": power on.
38	AU MUTE	O	Audio mute. "H": mute.
39	P1	—	Not used. Connected with P1 through P11.
40	P2	—	
41	P3	—	Not used. Connected with P1 through P11.
42	P4	—	
43	P5	—	
44	P6	—	
45	P7	—	
46	P8	—	
47	P9	—	
48	P10	—	
49	Vcc	—	EVER +5V power supply
50	P11	—	Not used. connected with P1 through P11
51	P12	—	Not used. connected with P12 through P32
52	P13	—	
53	N.C	—	Not used. (open)
54	P14	—	Not used. connected with P12 through P32
55	P15	—	
56	P16	—	
57	P17	—	
58	Vss	—	GND
59	P18	—	Not used. connected with P12 through P32
60	P19	—	
61	P20	—	
62	P21	—	
63	P22	—	
64	P23	—	
65	P24	—	
66	P25	—	
67	Vcc	—	EVER +5V power supply
68	P26	—	Not used. connected with P12 through P32
69	P27	—	
70	P28	—	
71	P29	—	
72	P30	—	
73	P31	—	
74	P32	—	
75	LINE SEL	O	Switch SLC and OSD communication (H: communicate with SLC)
76	N.C	—	Not used. (open)
77	MECH SO	I	32 bites serial transfer data input
78	MECH SI	O	32 bites serial transfer data output
79	MECH CLK	O	32 bites serial transfer clock
80	DOOR SW	I	Door switch input

Pin No.	Pin Name	I/O	Function
81	N.C	—	Not used. (open)
82	N.C	—	
83	AVss	—	GND
84	PSMON 1	I	Power monitor 1
85	PSMON 2	I	Power monitor 2
86	AD1	I	Unit key input
87	AD2	I	Unit key input
88	PSMON 3	I	Power monitor 3
89	N.C	—	Not used. (open)
90	POWER OFF	O	Power reset output (H: reset)
91	N.C	—	Not used. (open)
92	AVcc	—	EVER +5V power supply
93	$\overline{\text{PLAY LED}}$	O	Play LED output (L: lighting)
94	$\overline{\text{AR LED}}$	O	Auto resume LED output (L: lighting)
95	$\overline{\text{SA LED}}$	O	Side A LED output (L: lighting)
96	$\overline{\text{SB LED}}$	O	Side B LED output (L: lighting)
97	$\overline{\text{E2P WCTR}}$	O	EP2ROM write control (L: writing communication is going)
98	$\overline{\text{E2P CS}}$	O	EP2ROM CHIP select (L: communication is going)
99	N.C	—	Not used. (open)
100	Vcc	—	EVER +5V power supply

SECTION 7
ELECTRICAL ADJUSTMENTS

During the adjustment, see the parts arrangement diagram for adjustments on page from 7-18.

7-1. LIST OF SERVICING JIGS

- Oscilloscope
- Color monitor TV
- Digital voltmeter
- Frequency counter
- Remote commander (RMT-M23A)
- LD alignment disc HLV-8 (8-797-008-00) NTSC Ref. Disc 8

7-2. CAUTIONS ON ADJUSTMENT

- Disc load/unload operation must not be performed when servicing with the unit laying down sideways. (Never press the OPEN and CLOSE buttons.)
- When laying the unit down sideways, perform adjustment with the left side down and turn the power on.
- When adjusting the servo system, be sure to set up the unit horizontally.

7-3. OPERATION OF THE MDP-MR1 WITH HIDDEN KEY FUNCTIONS

1. Explanation of the hidden key functions

Special control functions to be used for the test or some other purposes of the MDP-MR1 are available by pressing at the same time and in specific order the multiple function keys on the main unit and/or on the remote control unit. The control functions available in this way are called “special key functions”.

The special key functions can be used in either of the following modes.

- the service mode
- the debugging mode
- the normal operation mode

The special key functions can be divided into two groups according to the key control operations as follows:

- Simultaneous main-unit-key-press functions
  Some control functions can be used by pressing simultaneously multiple specific keys on the main unit.
- Simultaneous main-and-remote-control-units-key-press functions
  Some other control functions can be used by pressing simultaneously two specific keys on the remote control unit while holding down a specific key on the main unit.

2. How to use “simultaneous main-unit-key-press functions”

The functions available by pressing simultaneously the multiple specific keys only on the main unit are called “simultaneous main-unit-key-press functions”. These functions are to be used when a quick operation such as “forced power off” is required.

The following table lists the currently available simultaneous main-unit-key-press functions.

Table 7-1. List of simultaneous main-unit-key-press functions

Keys to be pressed on the main unit	Functions
PAUSE key and POWER key	(1) Forced power off This function turns off power forcibly. It is to be used if you want to turn off the power in the following cases. • Operation of the mechanisms is out of control. • Power cannot be turned off by pressing the power key. Note that this function should be used with care because it may turn off the power in a half way of the operation of the mechanisms.
STOP key and POWER key	(2) Forced reset This function carries out initialization of the mode controller in addition to the forced power off function. It is to be used if you want to reset the mode controller in the following case. Something is wrong with the mode controller such that it operates with incorrect display. Note that once this function has been carried out, all information, including the history of emergency case, other than the trap-flag information in the debugging mode, will be deleted.
B side key and POWER key (With power off only)	(3) Lighting up all the LEDs on the main unit This function turns on all the LEDs after turning on the power automatically. Until you switched off the power, normal operation is possible while all the LEDs are lit.

3. How to use "simultaneous main-and-remote-control-units-key-press functions"

The functions available by pressing the two specific keys on the remote control unit while holding down the specific key on the main unit are called "simultaneous main-and-remote-control-units-key-press functions". It is necessary to press two keys on the remote control unit within about one second. This prevents an accidental use of these functions by the user.

These functions are to be carried out by using the stop key or the play key so that the operation of the mechanisms is not affected.

The following table lists the currently available simultaneous main-and-remote-control-units-key-press functions.

Table 7-2. List of simultaneous main-and-remote-control-units-key-press functions

Step	Keys to be pressed on the main unit and on the remote control unit	Functions
1 2	STOP key (main unit) and 0 key (remote control unit) STOP key (main unit) and STOP key (remote control unit)	(1) Debugging mode ON/OFF This function puts the unit in the debugging mode from another mode, or puts the unit in the mode other than the debugging mode from the debugging mode. For details on the debugging mode, refer to 7-5. "OPERATION OF THE MDP-MR1 IN THE DEBUGGING MODE".
1 2	STOP key (main unit) and 0 key (remote control unit) STOP key (main unit) and +l0 key (remote control unit)	(2) Make mechanism controller time out ineffective. Make the function turning power off ineffective when communication with mechanism controller cannot be done. When mechanism controller doesn't operate, it used to hasten to operate mode controller.
1 2	STOP key (main unit) and 0 key (remote control unit) STOP key (main unit) and 0 key (remote control unit)	(3) Make mechanism controller time out effctive. Make the function turning power off effective when communication with mechanism controller cannot be done.
1 2	STOP key (main unit) and 0 key (remote control unit) STOP key (main unit) and REPEAT key (remote control unit)	(4) EEPROM Clear The contents of the EEPROM's debugging mode data, etc. are all cleared. This is effective only turned the power on.

7-4. OPERATION OF THE MDP-MR1 IN THE SERVICE MODE

1. Explanation of the service mode

The functions for the use on reparation and maintenance (the service mode) are incorporated in the MDP-MR1. The mode in which those functions are available is called "the service mode". The following are the differences between the service mode and the normal operation mode.

(1) Special operations such as focusing search and sledding can be carried out.

(2) Power is not turned off automatically in an emergency condition of power off.

(3) When entering the service mode, also the debugging mode is started automatically. (For details of the debugging mode, refer to 7-5. "OPERATION OF THE MDP-MR1 IN THE DEBUGGING MODE".

2. Entering the service mode

The following procedure shows how to enter the service mode.

(1) While the power is turned off, connect the test pin (TP501 for service mode setting : Pin ③ of CN502), on the MB board of the main unit, to the ground

(2) Turn on the power by pressing the power key of the main unit. Nothing is displayed on the screen at this moment.

(3) Disconnect the test pin (the connection was performed in step (1) above) from the ground.
The service mode can be started when the background color changes in violet. If the background color is blue or black, the service mode is not available yet. If so, restart the procedure from step (1) above.
When the unit is in the service mode, it is also put in the debugging mode (the functions those available in both the modes can be used). Therefore, the version No. of the microprocessor appears on the screen. For details of the debugging mode, refer to 7-5. "OPERATION OF THE MDP-MR1 IN THE DEBUGGING MODE".

3. Quitting the service mode

To quits the service mode, press the power key and turn off the power. If you cannot turn off the power in this way (the operation of the mechanisms is not complete), carry out the forced power off function by pressing the pause key and the power key on the main unit at the same time.

4. Operating with the special key functions

The special key functions in the service mode are available only under NO DISC and STOP conditions, for safety purposes.
Check that the indication for those conditions is displayed without flashing on the screen. In order to carry out the special key functions listed in table 7-3, in the status above, turn off the 7 segments LED by pressing the 0 key and the 8 key on the remote control unit while holding down the STOP key on the main unit. and then press the desired key such as PLAY or PAUSE on the main unit.

The sledding motion with the SIDE A or SIDE B key is effective only while holding the Key pressed. However, the operation started with the PLAY or PAUSE key continues, once it is pressed, until you press the STOP key. While the unit is carrying out the special key function, the LED of AUTO RESUME of the main unit is lit.
Note that multiple special key functions cannot be started even if you press multiple keys at the same time.
When the 7segments LED is turned off, some keys are not effective.
Be sure to turn on the 7 segments LED by pressing the 0 key and then the 9 key on the remote control unit while holding down the STOP key on the main unit. if you don't want to carry out the special key functions.

Table 7-3. List of the special key functions

Key	Special key functions
SIDE A	Sledding in reverse direction (downward)
SIDE B	Sledding in normal direction (upward)
PLAY	Focusing search
PAUSE	Tilt servo ON
STOP	Stop special operations

The following are the details of the special key functions available with the MDP-MR1

(1) PLAY key for focusing search
Focusing search operation can be carried out repeatedly by holding down the PLAY key. There is no fault with the unit if the pick-up lens moves up and down.
Be sure to start the focusing search operation after checking the condition that the sled is placed in appropriate position (at around the center of side A). To stop the focusing search operation, press the STOP key.

(2) SIDE A key for sledding in reverse direction
The sled can be moved in reverse direction (center of side B, to edge of side B, to edge of side A, and then to center of side A) after completing initialization of the tilt (the tilt is placed in neutral position) by holding down the SIDE A key. To stop the sledding in reverse direction, release the SIDE A key.

(3) SIDE B key for sledding in normal direction
As contrary to item (2) above, the sled can be moved in normal direction (center of side A, to edge of side A, to edge of side B, and then to center of side B). This movement of the sled is desired when replacing the optical part. To stop the sledding in normal direction, release the SIDE B key.

(4) PAUSE key for tilt servo ON
The tilt servo is activated while holding down the PAUSE key. Move the sled to around the center of side A with the SIDE A and SIDE B keys, and put a CD or equivalent on the tray so that it screens the skew sensor. Then, if the tilt moves by pressing the PAUSE key, operation is normal.
The tilt can be placed back in neutral position by moving the sled with the SIDE A and SIDE B keys. To deactivate the tilt servo, press the STOP key.

7-5 OPERATION OF THE MDP-MR1 IN THE DEBUGGING MODE

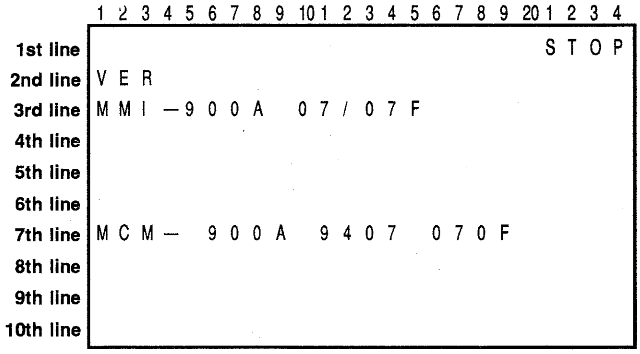
1. Explanation of the debugging mode

The contents in the RAM of the microprocessor can be displayed on the screen for the repair and maintenance purposes. The status of the MDP-MR1 in which this debugging function is available is called "the debugging mode".
The following are the differences between the debugging mode and the normal operation mode.

(1) The background color of the screen changes in green.
(2) Under the status described item (1) above, pressing the key on the remote control unit displays the history of emergency conditions or other debugging information.
Some keys are not effective when the background color of the screen is green.

2. Entering the debugging mode

To enter the debugging mode from a normal operation mode (in a normal status of operation), turn on the unit, press the 0 key and then the STOP key on the remote control unit while holding down the STOP key or the PLAY key on the main unit. When the following display appears on the screen, the unit is in the debugging mode. This display shows the version No. of the microprocessor. For details, refer to 5. (1) "[FRAME/TIME] key for displaying version No. of the microprocessor".
So as to valid the debugging command at the debugging mode, while pressing the STOP key or the PLAY key on the main unit, press the 0 key and the 8 key on the remote control unit to appear the green background on the picture.
So as to invalid the debugging command, while pressing the STOP key or the PLAY key on the main unit, press the 0 key and the 9 key on the remote control unit.



```
          1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
1st line                                          S T O P
2nd line  V E R
3rd line  M M I — 9 0 0 A   0 7 / 0 7 F
4th line
5th line
6th line
7th line  M C M —   9 0 0 A   9 4 0 7   0 7 0 F
8th line
9th line
10th line
```

Fig. 7-1. Initial display in the debugging mode

3. Quitting the debugging mode

To quits the debugging mode, press the clear key on the remote control unit when the menu (version No. of the microprocessor indication on the screen with green background in figure (7-1) is displayed.

The same key operation as "2. Entering the debugging mode" also sets the mode back in the normal operation mode.

4. Changing the display on the screen

The display is set for "debugging display" immediately after entering the debugging mode. The display mode can be changed in the same manner as in the norrnal operation mode by pressing the screen display key. In the debugging mode, however, "debugging display" mode can be selected as one of the display modes, in addition to "no display (displays nothing in most cases)", "small display (displays only the 1st line in most cases)", and "large display (displays full screen in most cases)" modes.

Pressing the screen display key in the normal operation mode changes the display mode as follows:

No display → Small display → Large display →

Pressing the screen display key in the debugging mode changes the display mode as follows:

No display → Small display → Large display → Debugging display

5. Explanation of the debugging display

In the debugging display mode, the information on the mode controller is displayed on the screen as a dump list. The title is displayed at the left on the 2nd line from the top. The data is displayed on the 3rd line through the 9th line.

The display of the data in one line consists of up to four sets (total of 8 bytes) of four character (2 bytes character each) sets in hexadecimal notation.

The information to be displayed can be selected in the debugging mode, by changing the screen background color to green and pressing the desired key (as listed below).

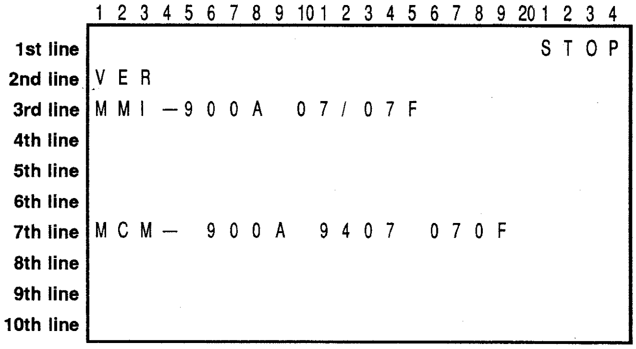
The following table lists the information which are currently available and which can be displayed.

Table 7-4. List of the keys to be used in the debugging mode and corresponding information

Keys	Information to be displayed
[FRAME/TIME]	Version No. of the microprocessor
[1]	History of the function modes
[2]	History of the emergency occurrence
[3]	Information for repair service of normally
[4]	Trap-flag
[5]	Key/remote control data
[7]	Information on communication with the mechanism controller
[PROGRAM] [REPEAT]	Information of operation

(1) [FRAME/TIME] key for displaying version No. of the microprocessor

Pressing this key displays the version No. of the microprocessor. The version No. of the mode controller appears on the 3rd line, and that of the mechanism controller appears on the 7th line. An example in figure 7-2 shows that the version No. of the mode controller is "MMI-900A 07/07F" and that of the mechanism controller is "MCM-900A 94/07/07F".



```
          1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
1st line                                          S T O P
2nd line  V E R
3rd line  M M I  −9 0 0 A  0 7 / 0 7 F
4th line
5th line
6th line
7th line  M C M −  9 0 0 A  9 4 0 7  0 7 0 F
8th line
9th line
10th line
```

Fig. 7-2. Version No. of the microprocessor

(2) [1] key for displaying the history of the function modes

Pressing this key displays the history of the principal operation commands (which represent function modes) sent from the mode controller to the mechanism controller.

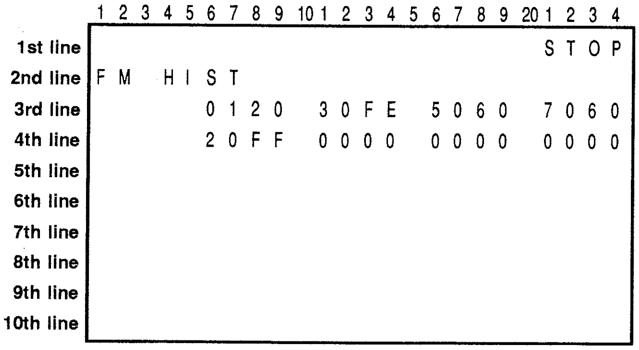
Up to 8 histories of the function modes can be displayed on a line. A total of 16 histories of the function modes are available using two lines. Unless the unit is unplugged, the data are kept intact in memory even when the unit is turned off.

The data to be stored appears on the screen from left to right 1 byte by 1 byte, and "FF" appears to the right of the last data byte. The data byte continues from the right end on the 1st line to the left end on the 2nd line, and from the right end on the 2nd line to the left end on the 1st line.

The last stored data of the function modes (which is the mode selected at present) appears on the left of "FF".

That is, when "FF" appears at the left end on the 1st (or the 2nd) line, the last stored data appears at the right end on the 2nd (or the 1st respectively) line.

"FE" means there has been an emergency case at the data point. To check the type of the emergency case, refer to 5. (3) "[2] key for displaying the history of the emergency occurrence".



```
          1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
 1st line                                         S T O P
 2nd line F M   H I S T
 3rd line           0 1 2 0   3 0 F E   5 0 6 0   7 0 6 0
 4th line           2 0 F F   0 0 0 0   0 0 0 0   0 0 0 0
 5th line
 6th line
 7th line
 8th line
 9th line
10th line
```

Fig. 7-3. History of the function modes

Figure 7-3 shows that the function modes have changed as follows:

01 (Power on start up)
→ 20 (Stop)
→ 30 (Start up of side A)
→ FE (An emergency occurred.)
→ 50 (Searching a chapter)
→ 60 (Playback)
→ 70 (Slow speed scanning in normal direction)
→ 60 (Playback)
→ 20 (Stop) [The last function mode]
Table 7-5 lists the function modes.

Table 7-5. List of the function modes

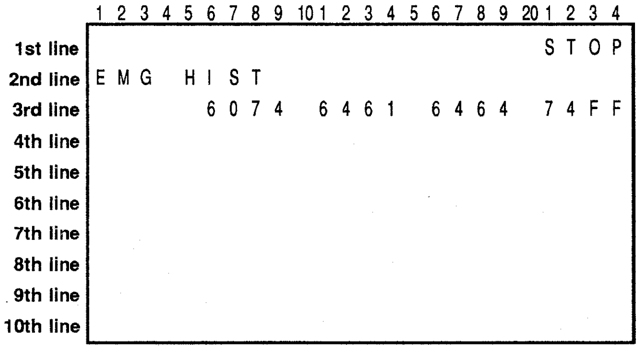
00	Power OFF
01	Power ON and start up
10	Open
20	Stop
30	Preparation for playback of side A
40	Preparation for playback of side B
50	Searching a chapter
51	Searching a frame/time
60	Playback
61	Pause
70	Slow speed scanning in normal direction
71	High speed scanning in normal direction
72	Slow speed scanning in reverse direction
73	High speed scanning in reverse direction
80	Still playback in normal direction
81	Step playback in normal direction
82	1/90 times speed playback in normal direction
83	1/30 times speed playback in normal direction
84	1/16 times speed playback in normal direction
85	1/8 times speed playback in normal direction
86	1/4 times speed playback in normal direction
87	1/2 times speed playback in normal direction
88	Normal (1 time) speed playback in normal direction
89	2 times speed playback in normal direction
8A	3 times speed playback in normal direction
8B	5 times speed playback in normal direction
8C	10 times speed playback in normal direction
90	Still playback in reverse direction
91	Step playback in reverse direction
92	1/90 times speed playback in reverse direction
93	1/30 times speed playback in reverse direction
94	1/16 times speed playback in reverse direction
95	1/8 times speed playback in reverse direction
96	1/4 times speed playback in reverse direction
97	1/2 times speed playback in reverse direction
98	Normal (1 time) speed playback in reverse direction
99	2 times speed playback in reverse direction
9A	3 times speed playback in reverse direction
9B	5 times speed playback in reverse direction
9C	10 times speed playback in reverse direction
FE	Appears for indicating an occurrence of emergency
FF	Appears next to the last data.

(3) [2] key for displaying the history of the emergency occurrence

Pressing this key displays the history of the emergency occurrence with the codes sent from the mechanism controller to the mode controller.

The data will be "00" if there has been no emergency case since when the unit has been plugged in.

The display type is the same as that for the history of the function modes. However, up to 8 histories using only one line are available in this case. The emergency code which appears just before "FF" corresponds to the data of "FE" in the history of the function modes, which is the closest one to "FF".



```
          1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4
1st line                                             S T O P
2nd line  E M G   H I S T
3rd line          6 0 7 4   6 4 6 1   6 4 6 4   7 4 F F
4th line
5th line
6th line
7th line
8th line
9th line
10th line
```

Fig. 7-4. History of emergency

Figure 7-4 shows that the emergency has occurred in the following order because the data next to "FF" is 60 on the left of the line.

60 (Detection of lead-in point)
→ 74 (Focusing failed)
→ 64 (Detection of minimum chapter)
→ 61 (Detection of lead-out point)
→ 64 (Detection of minimum chapter)
→ 64 (Detection of minimum chapter)
→ 74 (Focusing failed) [The last emergency]

Table 7-6 lists the emergency codes.

Table 7-6. List of the emergency codes

		Operation after occurence
• For operation of forced modes condition		
01	Requirement of forced power off	Power off
02	Requirement of forced ejection of the tray	Eject
03	Requirement of stop	Stop
04	Requirement of stop when opening the door	Stop
05	Requirement of forced playback	Play
06	Requirement of determination for mode change when power off	Freezes power off display
07	Requirement of power off after communication stops.	Power off
08	No movement of the front door.	Power off
09	The door opens without the tray opens.	Power off
• For operation of mechanisms		
10	Detection of movement for pushing in the tray	Play
11	Detection of no movement of the tray	Power off
20	Detection of no movement of the sleder	Power off
30	Detection of no movement of the tilt	Power off
31	Avoidance treatment execution of no movement of the tilt.	None
• For operation of Spindle control		
40	No detection of the spindle FG	Power off
41	No achievement of continuous servo lock from FG servo to H servo	Stop
42	Above the high rotation limit	Stop
43	Below the low rotation limit	Stop
44	No complete stop operation for the spindle movement	Power off
45	Time over error for the spindle control operation	Power off
• For start up operation		
50	Focusing failed	Stop
51	Focusing failed (with a disc loaded)	Stop
52	Detected as if the disc was an LD	None
53	Focusing of 8 inches LD failed	Stop
54	Reading of TOC failed on a disc of CD or CDV	Stop
• For playback operation		
60	Detection of the lead-in code	Play or soon
61	Detection of the lead-out code	Stop/Pause or soon
62	Detection of the lead-out of part A on CDV	Stop/Pause or soon
63	Detection of a picture stop	Still
64	Detection of the minimum chapter	None
65	Reading of sub code failed on a disc of CD or CDV	Stop
66	Reading of philips code failed and disc of LD	Stop
67	Avoidance treatment execution of locked group	None
• For search operation		
70	Detection of over search	Play
71	Detection of under search	Play
72	Time over for the search operation	Play
74	Focusing failed during searching	Stop
76	Retry execution after focusing failed.	None
• The following emergency occurs in mode contoller		
80	Emergency time out	Power off
81	Search time out	Play
82	Mechanism controller communication time out	Power off
86	Emergency of 12V power supply	Origin power off

(4) [3] key for displaying the information for repair service, sent from the mechanism controller
Pressing this key displays the information sent from the mechanism controller, which is necessarv for repair service. At present, the information listed in table 7-7 is available. Data numbers in the table correspond to the numbers on the 3rd line through the 5th line in figure 7-5.

Table 7-7. Information for repair service, sent form the mechanism controller

Data number	Data
(02)	Mode of mechanisms (internal mode of the mechanism controller) See the following section for details.

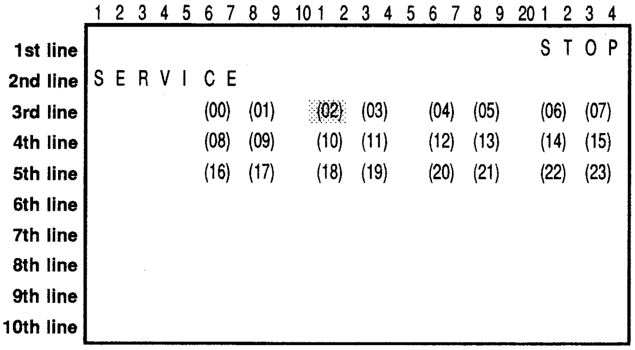


Fig. 7-5. Information for repair service sent form the mechanism controller

- About the operation modes of the mechanisms
  The operation modes of the mechanisms are the basic operation mode in the mechanism controller. Those almost the same as those available with the unit as the function modes. But, there are several supplemental modes for the mechanisms.
  The table below shows the operation modes of the mechanisms.

Table 7-8. Operation modes of the mechanisms

Modes of the mechanisms	Functions
00	Power off
01	Initialization of the mechanism controller (Without operating the mechanisms)
03	In the process from power ON to power OFF
04	In the process from power OFF to power ON
05	Initialization of the mechanisms and related ICs.
10	Ejected status of the tray
11	In the process of ejection of the tray
12	In the process of loading of the tray
20	In stop status with the disc chucking up
21	In the process of chucking up form chucking of side A
22	In the process of chucking of side A from chucking up
23	In chucking status of side A
30	Until focusing of side A has been achieved
31	From lock of focusing to start-up of 0 search
32	In operation from side A/B to stop
33	In process of reversing side B form side A
40	Until focusing of side B has been achieved
50	Chapter search
51	Frame/Time search
60	Play
61	Pause
70	Slow speed normal direction scanning
71	High speed normal direction scanning
72	Slow speed reverse direction scanning
73	High speed reverse direction scanning
74	In the process of scanning completion
80—FF	(The same as function mode)

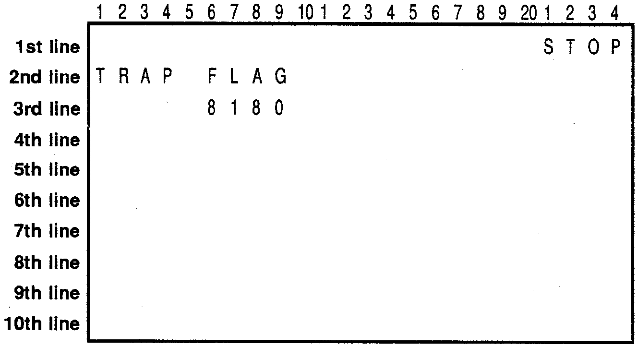
(5) [4] key for displaying the trap-flags

Pressing this key displays the cause of "an abnormal power off" of the mode controller (this excludes when it is turned off with the power key).

The one byte at the right (2 digits of hexadecimal notation) is the flag which has specific meaning. The bit which corresponds to the cause of the last abnormal power off is set 1.

The one byte at the left is the flag for all (logic OR of) the causes of abnormal power off since when the unit has been plugged in.

Both the flags can be set cleared by pressing the clear key when the background color of the screen is green.



```
           1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
 1st line                                          S T O P
 2nd line  T R A P   F L A G
 3rd line            8 1 8 0
 4th line
 5th line
 6th line
 7th line
 8th line
 9th line
10th line
```

Fig. 7-6. Trap-flag

An example of the trap-flag shown in figure 7-6 shows that there have been two cases of abnormal power off before; 80 by abnormal voltage level and 01 by forced reset by the user (see the byte 81 in hexadecimal notation on the left). It also shows that the last abnormal power off has been caused by 80 (abnormal voltage level) (see the byte 80 in hexadecimal notation on the right).

Table 7-9. Trap-flag and bits and their meaning

Bit number (Pattern)	Causes
7 (80h)	Power off caused by abnormal voltage level
6 (40h)	Power off caused by abnormal communication with the mechanism controller
5 (20h)	Power off caused by an occurrence of emergency
4 (10h)	Forced power off by the key operation
3 (08h)	Resetting by self-check of the mode controller
2 (04h)	Resetting by self-check of the mode controller
1 (02h)	Resetting by self-check of the mode controller
0 (01h)	Forced resetting by the key operation

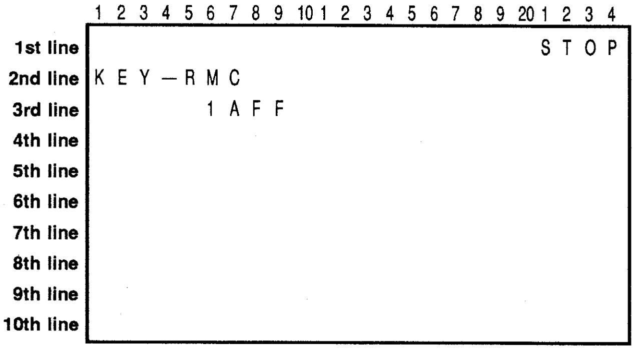
Note : Resetting, which is indicated with bits 0 to 3 in the table, means that setting the status of the mode controller back to the same status as that when the unit was plugged in, except for initialization of the trap-flag.

A of hexadecimal notation is 2+8. In the same manner, B=1+2+8, C=4+8, D=1+4+8, E=2+4+8, F=1+2+4+8.

(6) [5] key for displaying the key/remote control data

Pressing this key displays the key input data of the main unit and the input data by the remote control unit, using SIRCS codes. Note that this operation is effective on the remote control unit for MDPs only.

The one byte (2 digits in hexadecimal notation) on the left of the 3rd line in figure 7-7 is the SIRCS code of the key input data of the main unit, and that on the right is the SIRCS code of the input data by the remote control unit. When no key is pressed or there is no input, "FF" appears. When two keys are pressed almost at the same time, the SIRCS code of the input data by the first pressed key will appear.



```
           1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
 1st line                                          S T O P
 2nd line  K E Y — R M C
 3rd line            1 A F F
 4th line
 5th line
 6th line
 7th line
 8th line
 9th line
10th line
```

Fig. 7-7. Key and remote control data

An example in figure 7-7 shows that the playback key (1A in hexadecimal notation) on the main unit is pressed but there is no input (FF in hexadecimal notation) from the remote control unit.

However, note that, in some cases, the remote control unit generates SIRCS codes momentarily only at the moment when the key is pressed.

Table 7-10. List of SIFRCS codes for MDPs

00	Numeral 1
01	Numeral 2
02	Numeral 3
03	Numeral 4
04	Numeral 5
05	Numeral 6
06	Numeral 7
07	Numeral 8
08	Numeral 9
09	Numeral 0
0B	Search/sledding
0C	Frame/time
0F	Clear
15	Power ON/OFF
16	Close/open of tray
17	Audio monitoring
18	Stop
19	Pause
1A	Playback
1E	Reverse direction scanning
1F	Normal direction scanning
29	Repeat
2B	Still/step in normal direction
2C	Still/step in reverse direction
30	Program
34	ACS in normal direction
35	ACS in reverse direction
39	Numeral +10
3A	Screen display
40	Analog audio/CX
44	Return
47	l/one side/double side
5D	side A
5E	side B
64	Numeral 10
65	Numeral 11
66	Numeral 12
67	Numeral 13
77	Numeral 14
79	Numeral 15
FF	Appears when there is no input.

(7) [7] key for displaying the information on communication with the mechanism controller

Pressing this key displays the communication data with the mechanism controller.

The data transmitted from the mode controller to the mechanism controller appears on the 3rd line through the 5th line. The data transmitted from the mechanism controller to the mode controller appears on the 7th line through the 9th line. The exclamation marks ! at the left on the 8th and the 9th lines indicate that the communication is carried out successfully. Question mark ? appears if communication stops. A bracket mark [■] appears if communication stops after carrying out once the communication on the purpose of servicing.

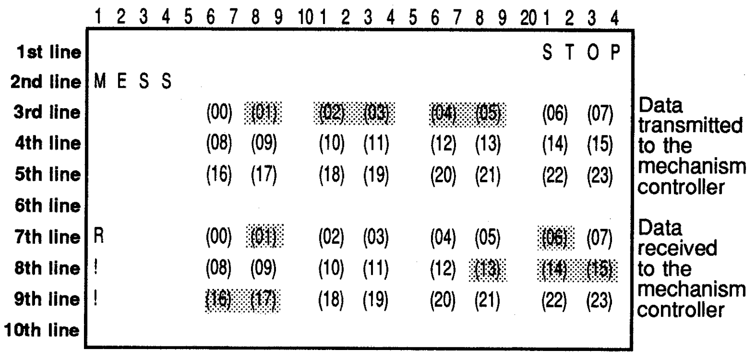

1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4
1st line
2nd line
3rd line
4th line
5th line
6th line
7th line
8th line
9th line
10th line
S T O P
M E S S
(00) (01) (02) (03) (04) (05) (06) (07)
(08) (09) (10) (11) (12) (13) (14) (15)
(16) (17) (18) (19) (20) (21) (22) (23)
R (00) (01) (02) (03) (04) (05) (06) (07)
! (08) (09) (10) (11) (12) (13) (14) (15)
! (16) (17) (18) (19) (20) (21) (22) (23)
Data transmitted to the mechanism controller
Data received to the mechanism controller

Fig. 7-8. Information on communication with the mechanism controller.

The table below shows some communication information.

Table 7-11. Principal communication information

Data from the mode controller to the mechanism	
(01) (02) (03—05)	The function mode at present (next) The function mode of final purpose Target address of search (Time/Frame)
Data from the mechanism controller to the mode controller	
(01) (06) (13) (14) (15—17)	The function mode at present (next) The flag for completion of function mode change (0 bit) Current chapter/track number Current index number Current address (Time/Frame)

(8) [PROGRAM] key and [REPEAT] key for displaying the information of operation
While indicating the microcomputer version number, to press in order the PROGRAM key and the REPEAT key of the remote control unit, the information of operation is displayed on the screen.
On the third line, that number indicates the optical operating time. From the fourth line to the ninth line, that number indicates the number of times which are received SIRCS command at sexadecimal digit.

```
           1 2 3 4 5 6 7 8 9 101 2 3 4 5 6 7 8 9 201 2 3 4
1st line                                           S T O P
2nd line   O P E R A T E
3rd line   O P T     0 0 1 2   3 0 4 7                       Optical Operating Time
4th line   O / C     0 0 1 B   0 0 0 E                       OPEN/CLOSE
5th line   S T O P   0 0 3 D   0 0 2 2                       STOP
6th line   P L A Y   0 0 1 4   0 0 3 9                       PLAY
7th line   P A U S E 0 0 0 9   0 0 2 0                       PAUSE
8th line   S   A     0 0 0 4   0 0 0 F                       SIDE A
9th line   S   B     0 0 2 A   0 0 1 2                       SIDE B
10th line
```

Fig. 7-9. Information of Operation

In the case of Fig. 7-9, the optical operating time was shown 12 hours 30 minutes 47 seconds.
And, the received SIRCS command is counted the main unit key and the remote control key separately.
In the case STOP key, the number of received times is 3Dh = 61 times from the main unit key and is 22h = 34 times from the remote control unit key.

7-6. POWER SUPPLY ADJUSTMENT

7-6-1. EVER 5V Adjustment (POWER SUPPLY BLOCK)

Mode	Stop
Measurement point	Pin ② of CN052 (Pin ⑦, GND)
Measuring equipment	Digital voltmeter
Adjusting element	VR201
Specified value	5.0 ± 0.3Vdc

Adjustment method :
1) Adjust VR201 to 5.0 ± 0.3V

7-6-2. REG +5V Adjustment (POWER SUPPLY BLOCK)

Mode	Stop
Measurement point	Pin ④ of CN052 (Pin ③, GND)
Measuring equipment	Digital voltmeter
Adjusting element	VR202
Specified value	5.0 ± 0.3Vdc

Adjustment method :
1) Adjust VR202 to 5.0 ± 0.3V

7-6-3. Power Supply Check (POWER SUPPLY BLOCK)

Mode	Stop
Measuring equipment	Digital voltmater
UNREG +16V check	
Measurement point	Pin ⑪ of CN051 (Pin ⑫, GND)
Specified value	16.4 ± 1.5Vdc
UNREG -16V check	
Measurement point	Pin ⑭ of CN051 (Pin ⑬, GND)
Specified value	–15.3 ± 1.5Vdc
REG +12V check	
Measurement point	Pin ⑲ of CN051 (Pin ⑱, GND)
Specified value	12.0 ± 0.8Vdc
REG -12V check	
Measurement point	Pin ⑰ of CN051 (Pin ⑱, GND)
Specified value	–12.0 ± 0.8Vdc
REG -5V check	
Measurement point	Pin ⑥ of CN052 (Pin⑦, GND)
Specified value	-5.0 ± 0.3Vdc

- Confirm that the power supply voltages satisfy the respective specified values.

7-7. SYSTEM CONTROL SYSTEM ADJUSTMENT

7-7-1. Microprocessor Clock Adjustment (MB-717 Board)

Mode	Stop
Measurement point	Emitter of Q028 (Pin ⑰ of IC002)
Measuring equipment	Frequency counter
Adjusting element	CT001
Specified value	14318180 ± 40Hz

Adjustment method :

1) Adjust CT001 to 14318180 ± 40Hz.

7-8. SERVO SYSTEM ADJUSTMENT

7-8-1. LD Side A Tilt Balance Adjustment

1) Put the LD alignment disc HLV-8 in with the CAV side to the side A, play it and pause at the chapter 3 (#2201).
2) Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV401 so that the RF waveform goes maximum in the state the tracking and the sled are on.

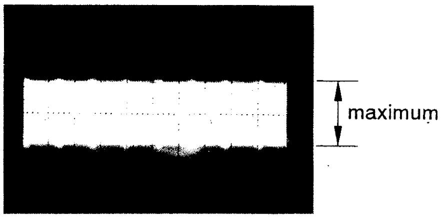


Fig. 7-10.

3) Play #770 and pause.
4) Check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and minimum.

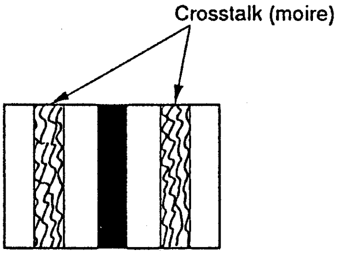
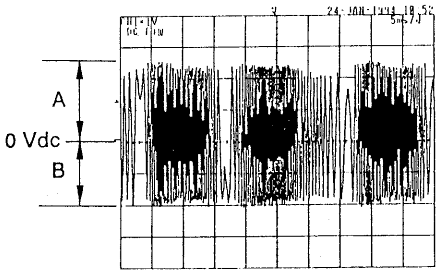


Fig. 7-11.

5) Tracking gain and focus gain adjustments are not necessary.
   — Already adjusted at the optical pick-up block side —
6) Check the tracking bal.
   Measure the registance at the Y terminal of TRACKING ERR on jig with oscilloscope.



Check that it meets $-5 \leqq \frac{A - B}{2(A+B)} \times 100\ (\%) \leqq 8$

Fig. 7-12.

7) Then turn on the TRACKING and SLED to check the waveform of 1 track jump in STILL.

Check that it meets $B \leqq \frac{1}{2}A$

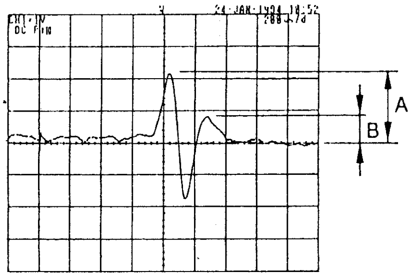
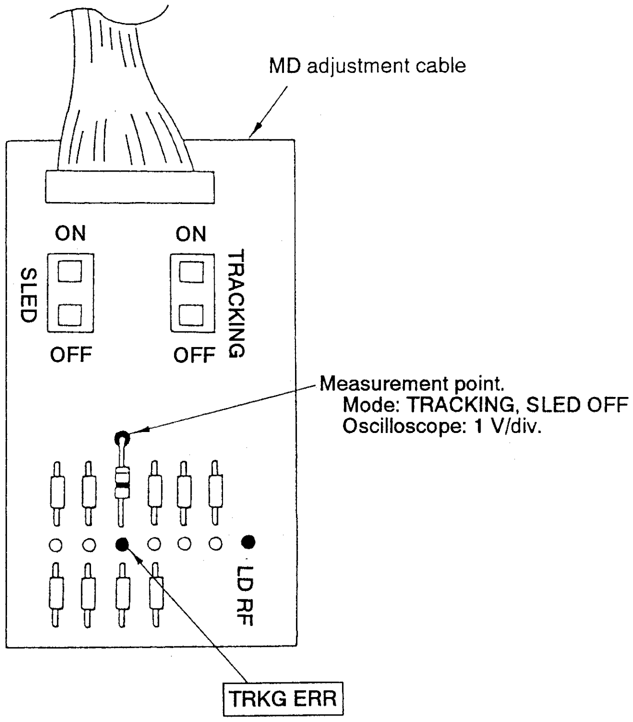


Fig. 7-13.

Check the TRACKING BALANCE.

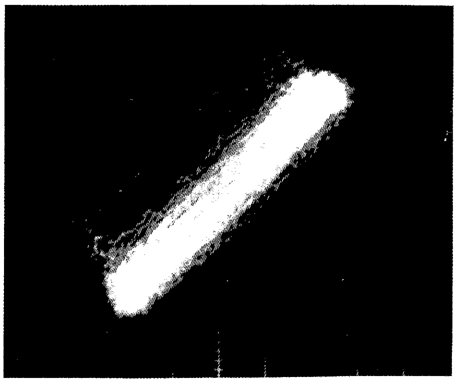


Measurement point.
Mode: TRACKING, SLED OFF
Oscilloscope: 1 V/div.

Fig. 7-14.

7-8-2. LD Side B Tilt Balance Adjustment

1) Loosen the side B RD screw and TAN screw (hexagonal screw 2.6) on the feed base.
2) Put the LD alignment disc HLV-8 in with the CAV side to the side B, play it and pause at the chapter 3 (#2201).
3) Turn off the SLED and tracking, and adjust inserting an eccentric screwdriver to B RD adjustment hole so that the Lissagous waveform meets standard.



Jig terminal : E, F
Oscilloscope : X/Y lissagous 20 mV/div.
Phase difference : Within 35°

Fig. 7-15.

4) Connect an oscilloscope to LD RF terminal on the MD adjustment cable and adjust RV402 so that the RF waveform goes maximum in the state the tracking and the sled are on.

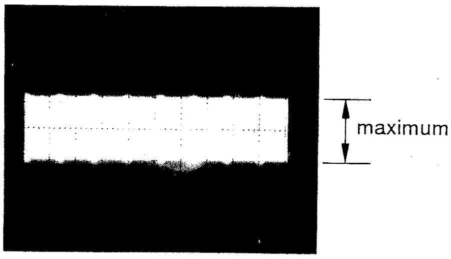


Fig. 7-16.

5) Insert an eccentric screwdriver to B TAN adjustment hole and adjust the RF waveform goes maximum similarly to the item 4).
6) Play #770 and pause.
   At this time in the same manner as the side A, check that the vertical bar appears on TV monitor and right and left crosstalks (moire) are the same level and maximum.
7) Take out the disc to tighten B TAN and RD screw.

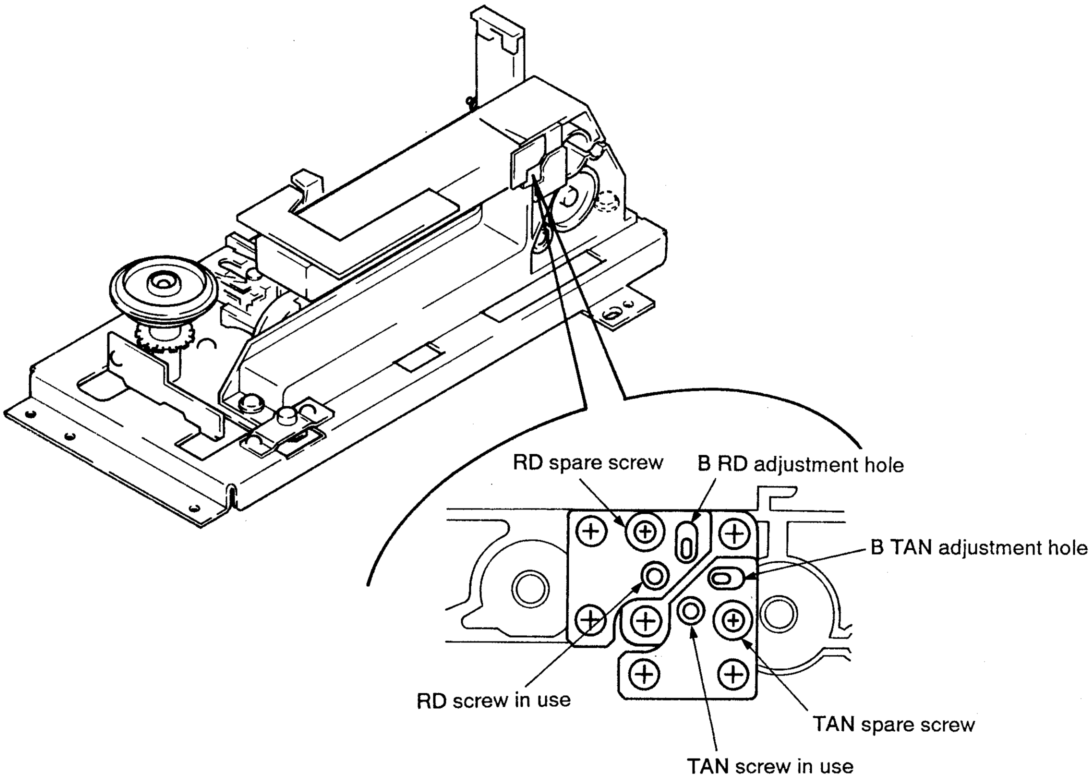


Fig. 7-17.

7-9. VIDEO SYSTEM ADJUSTMENT

7-9-1. Video Output Level Adjustment (MB-717 Board)

Mode	Still
Signal	Frame 4100 (Color bar)
Measurement point	J203 (VIDEO OUT terminal) (Terminated to 75Ω)
Measuring equipment	Oscilloscope
Adjusting element	RV001
Specified value	1.00 ± 0.02 Vp-p

Adjustment method :

1) Select STILL (▶◀) mode.
2) Search the frame 4100 and apply a color bar signal.
3) Adjust RV001 for 1.00 ± 0.02 Vp-p.

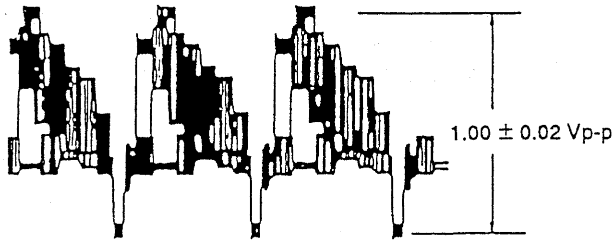


Fig. 7-18.

7-10. ADJUSTMENT AFTER THE ATTACHMENT OF THE OPTICAL PICK-UP BLOCK

7-10-1. Jigs and Tools

- Hexagonal wrench (Tangential screwdriver: 7-700-766-04)
- Oscilloscope
- MD adjustment cable (J-6082-059-B)
- Alignment disc Ref. 8 (HLV-8: 8-797-008-00)/LD YEDS-18 (3-702-101-01) or an equivalent/CD
- Decentering screwdriver 4 ø (J-6095-029-A)

* Insert the terminal of the connector conversion jig to CN401 of the MB-717 Board.

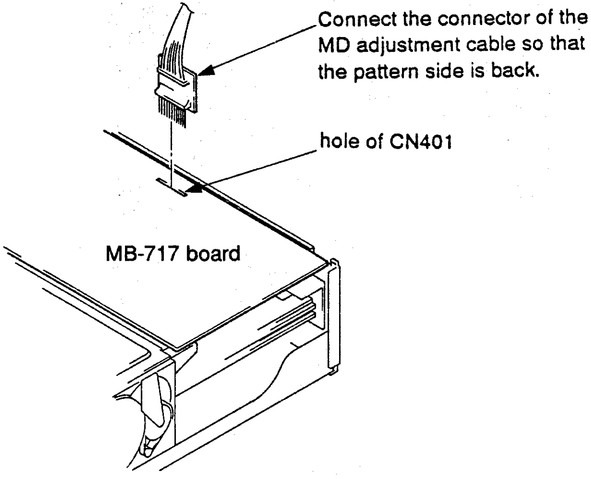

Connect the connector of the MD adjustment cable so that the pattern side is back.
hole of CN401
MB-717 board

Fig. 7-19.

7-10-2. CD Adjustment

1) Loosen the screws of feed base block assembly.

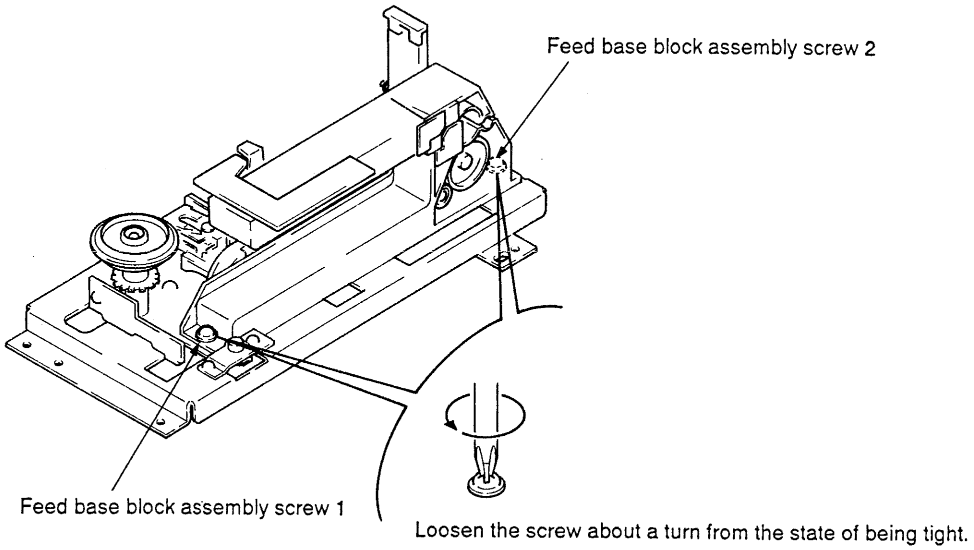

Feed base block assembly screw 2
Feed base block assembly screw 1
Loosen the screw about a turn from the state of being tight.

Fig. 7-20.

2) Playback the CD alignment disc (YEDS-18) to press the Pause button about 3 seconds later.

3) Connect the oscilloscope to LD RF of the MD adjustment cable to see if the waveform shown below appears.

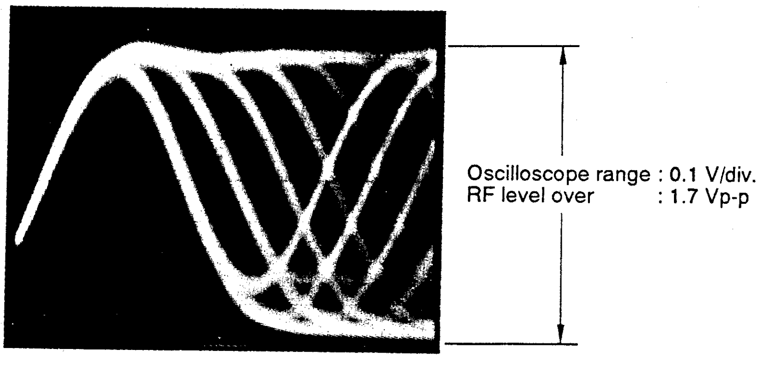


Fig. 7-21.

4) Insert the A TAN screw with hexagonal wrench 2.6 into the hole of top surface of chucking assembly to adjust so that RF Level is maximum. (Over 1.7 Vp-p)

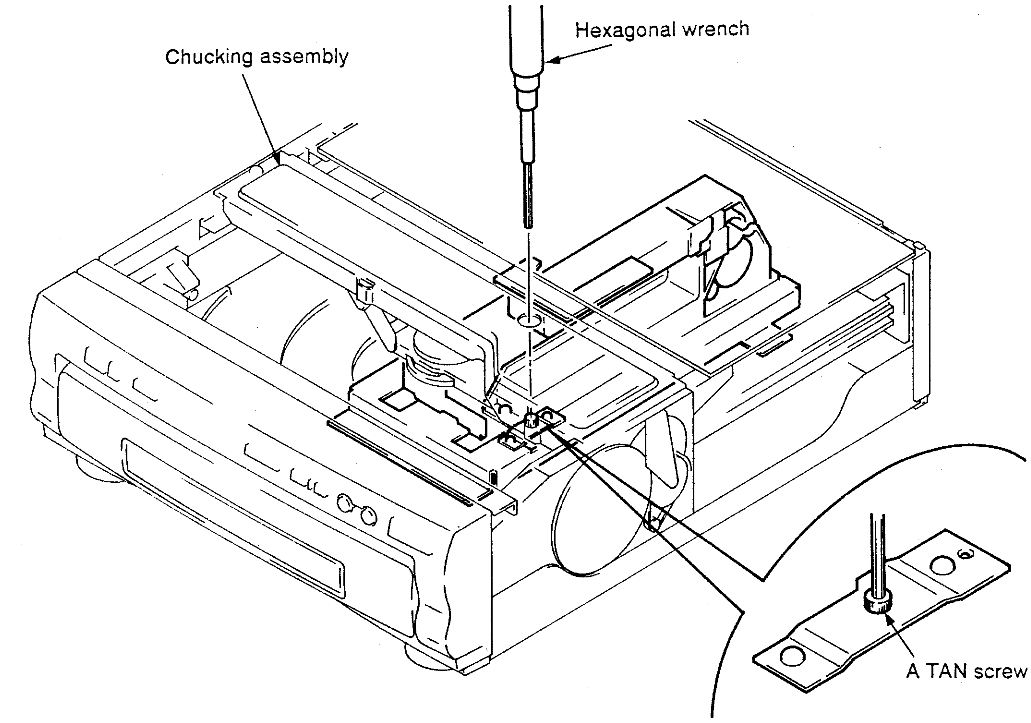
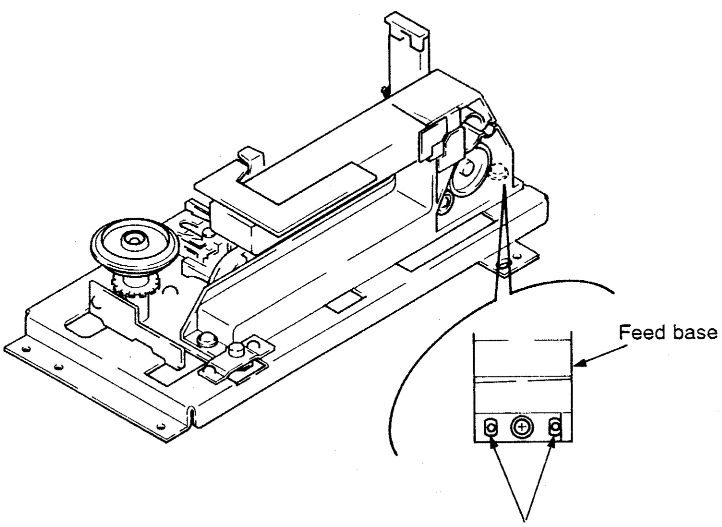


Fig. 7-22.

5) Insert decentering screwdriver into the feed base block assembly for RD adjustment.



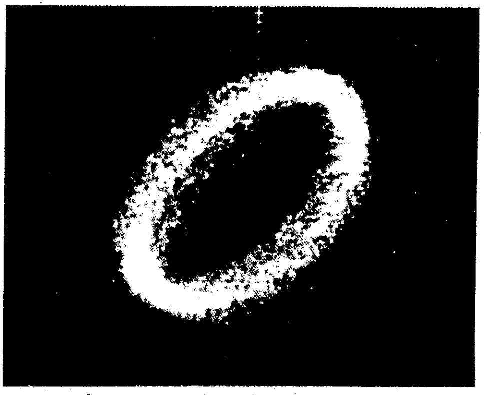
Insert the decentering screwdriver to either one of the holes for adjustment.

Fig. 7-23.

6) Take the DISC out to tighten the 2 screws of the feed base.
7) Apply suitable locking compound to A TAN screw.

Terminal E, F/TRK, SLED OFF
Oscilloscope X/Y Lissagous range
Difference within 35° with each 20 mV/div.

Before the adjustment.



Make the figure straight.

After the adjustment.

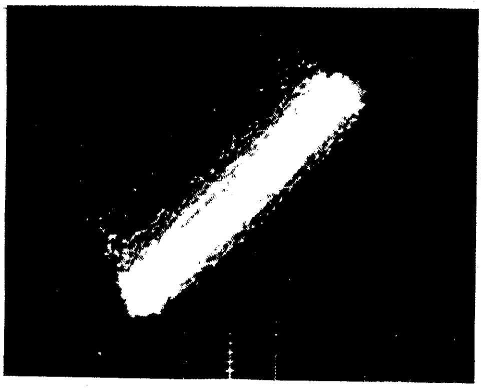
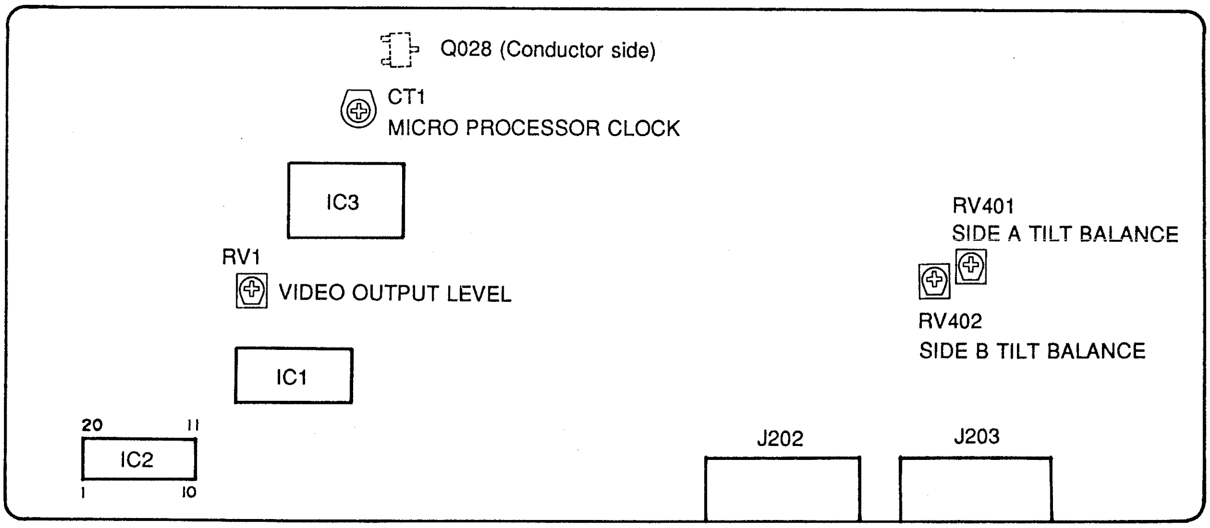


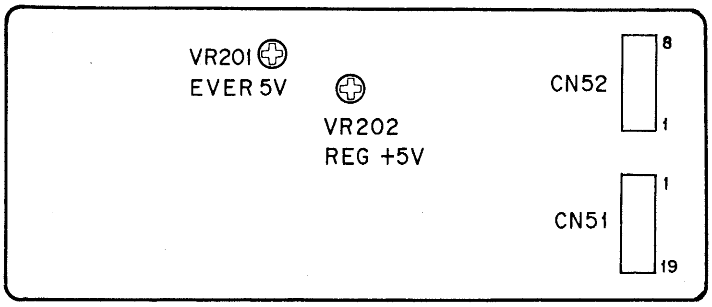
Fig. 7-24.

7-11. PARTS ARRANGEMENT DIAGRAM FOR ADJUSTMENT

MB-717 Board (Component Side)


Q028 (Conductor side)
CT1
MICRO PROCESSOR CLOCK
IC3
RV401
SIDE A TILT BALANCE
RV1
VIDEO OUTPUT LEVEL
RV402
SIDE B TILT BALANCE
IC1
20
11
IC2
1
10
J202
J203

POWER SUPPLY BLOCK (Component side)


VR201
EVER 5V
VR202
REG +5V
CN52
8
1
CN51
1
19

MDP-MR1
RMT-M23A/M23B

SONY

SERVICE MANUAL

E Model
Hong Kong Model
Taiwan Model
Chinese Model
ME Model

SUPPLEMENT-1

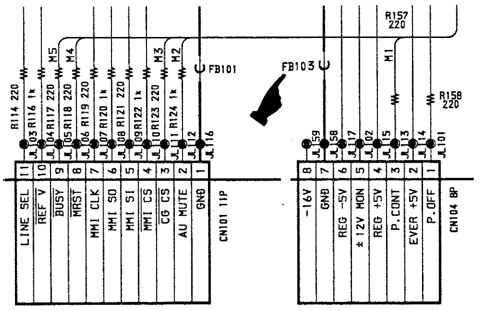
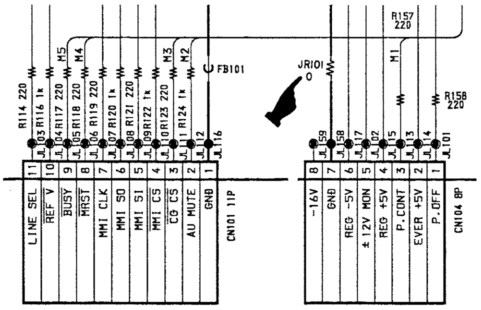
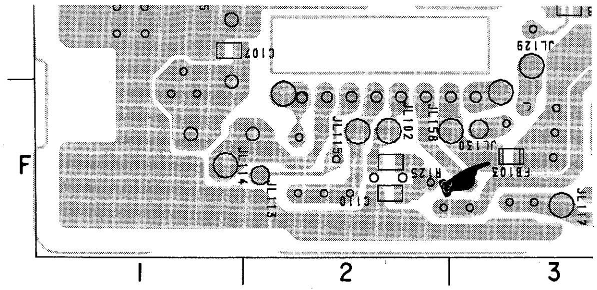
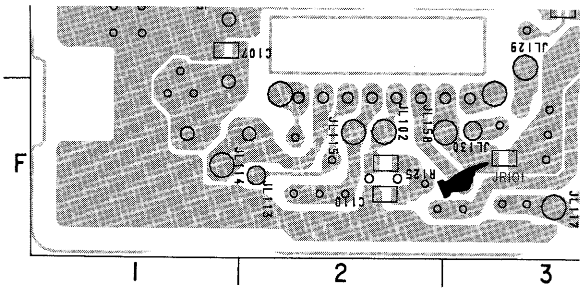
File this supplement with the Service Manual.

Subject : POWER BLOCK addition
Board change

- A schematic diagram, a printed wiring board and a parts list of POWER BLOCK are added.
- As the end of number of FP-740 board is changed from $\boxed{\text{-12}}$ to $\boxed{\text{-13}}$, a printed wiring board diagram is added.
- Change in some parts of the MB-717 board.

• PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

☛ : indicates corrected portion

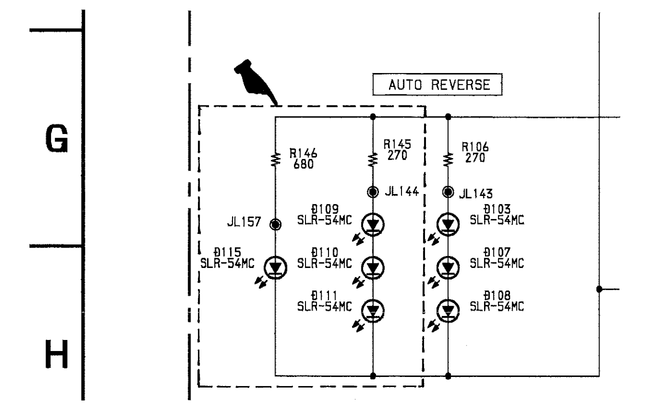
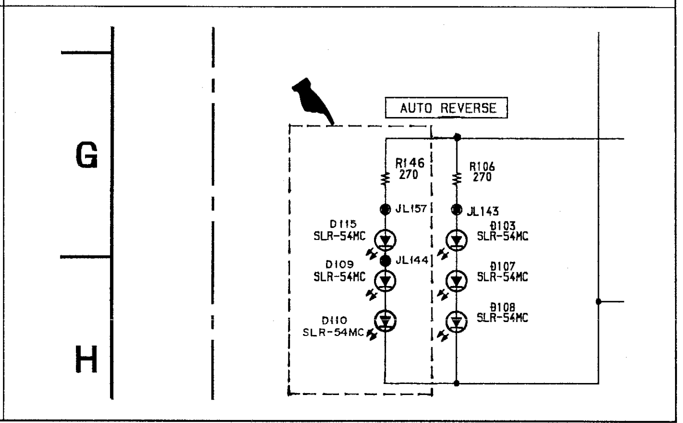
INCORRECT	CORRECT
FP-740 BOARD (Page 4–35) Location: I-6	**FP-740 BOARD** (Page 4–35) Location: I-6
 FB101 FB103 R157 220 R158 220 CN101 11P LINE SEL REF V BUSY MRST MMI CLK MMI SO MMI SI MMI CS CG CS AU MUTE GND CN104 8P -16V GND REG -5V ± 12V MON REG +5V P.CONT EVER +5V P.OFF	 FB101 JR101 0 R157 220 R158 220 CN101 11P LINE SEL REF V BUSY MRST MMI CLK MMI SO MMI SI MMI CS CG CS AU MUTE GND CN104 8P -16V GND REG -5V ± 12V MON REG +5V P.CONT EVER +5V P.OFF
FP-740 BOARD (CONDUCTOR SIDE) (Page 4–32)	**FP-740 BOARD (CONDUCTOR SIDE)** (Page 4–32)
 F C107 JL129 JL102 JL158 JL150 JL130 R125 FB103 JL114 JL113 C110 JL117 1 2 3	 F C107 JL129 JL102 JL158 JL150 JL130 R125 JR101 JL114 JL113 C110 JL117 1 2 3
Ref. No. Part No. Description FB103 1-414-135-11 INDUCTOR CHIP 0uH	Ref. No. Part No. Description JR101 1-216-295-91 CONDUCTOR CHIP (2012)

FP-740 (MODE CONTROL) PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

— Ref. No. POWER BLOCK: 5000 series —

☛ : Indicates changed portion

FP-740 BOARD (Page 4–35) Location: G-1

-12	-13
 G H AUTO REVERSE R146 680 R145 270 R106 270 JL144 JL143 JL157 D109 SLR-54MC D103 SLR-54MC D115 SLR-54MC D110 SLR-54MC D107 SLR-54MC D111 SLR-54MC D108 SLR-54MC	 G H AUTO REVERSE R146 270 R106 270 JL157 JL143 D115 SLR-54MC D103 SLR-54MC D109 SLR-54MC JL144 D107 SLR-54MC D110 SLR-54MC D108 SLR-54MC

Parts List

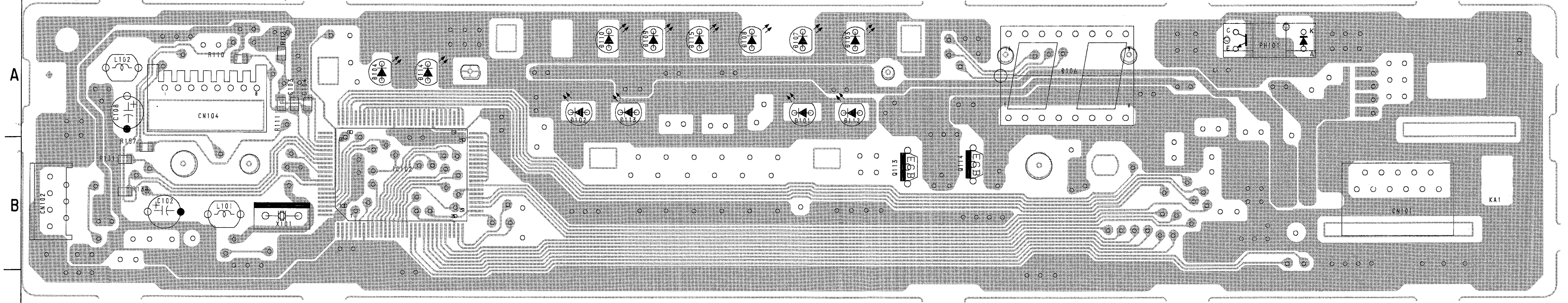
Only the following parts are different for the FP-740 board

Ref. No.	-12		-13	
	Part No.	Description	Part No.	Description
D111	8-719-955-04	DIODE PY5504S-1		————
R145	1-216-035-00	METAL CHIP 270 5% 1/10W		————
R146	1-216-045-00	METAL CHIP 680 5% 1/10W	1-216-035-00	METAL CHIP 270 5% 1/10W

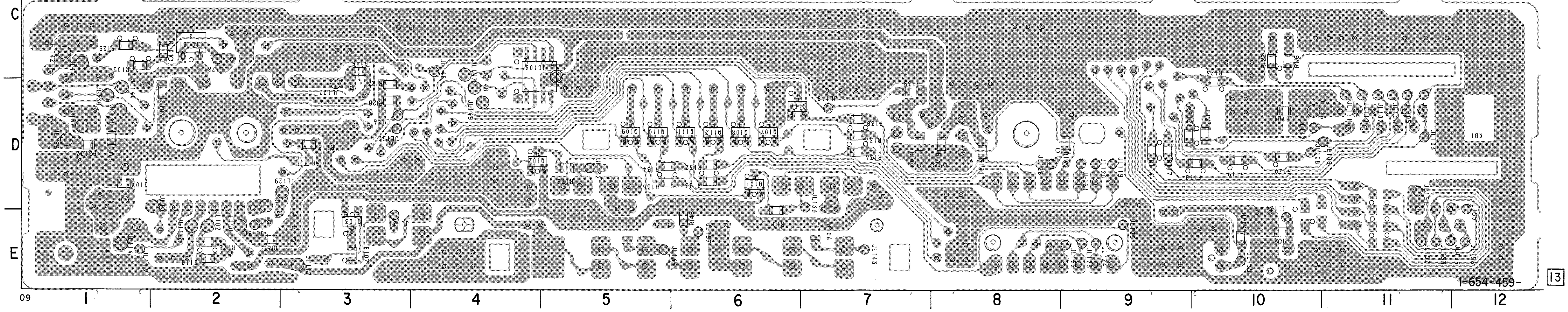
FP-740 BOARD

CN101	B-11
CN102	B-1
CN104	A-2
D101	A-6
D102	A-5
D103	A-7
D104	A-3
D106	A-8
D107	A-6
D108	A-6
D109	A-5
D110	A-5
D112	A-7
D113	A-5
D114	A-4
D115	A-6
IC101	C-2
IC102	B-3
IC103	C-4
PH101	A-10
Q101	D-6
Q102	D-4
Q103	E-3
Q106	D-6
Q107	D-6
Q108	D-6
Q109	D-5
Q110	D-5
Q111	D-6
Q112	D-6
Q113	B-7
Q114	B-8

FP-740 BOARD (COMPONENT SIDE)


A
B
CN104
CN102
CN101
IC102
PH101
KA1
L102
L101
C108
C102
X101
R110
R111
R137
R138
R157
D101
D102
D103
D104
D106
D107
D108
D109
D110
D112
D113
D114
D115
Q113
Q114

FP-740 BOARD (CONDUCTOR SIDE)


C
D
E
09
1
2
3
4
5
6
7
8
9
10
11
12
IC101
IC103
KB1
1-654-459-
13

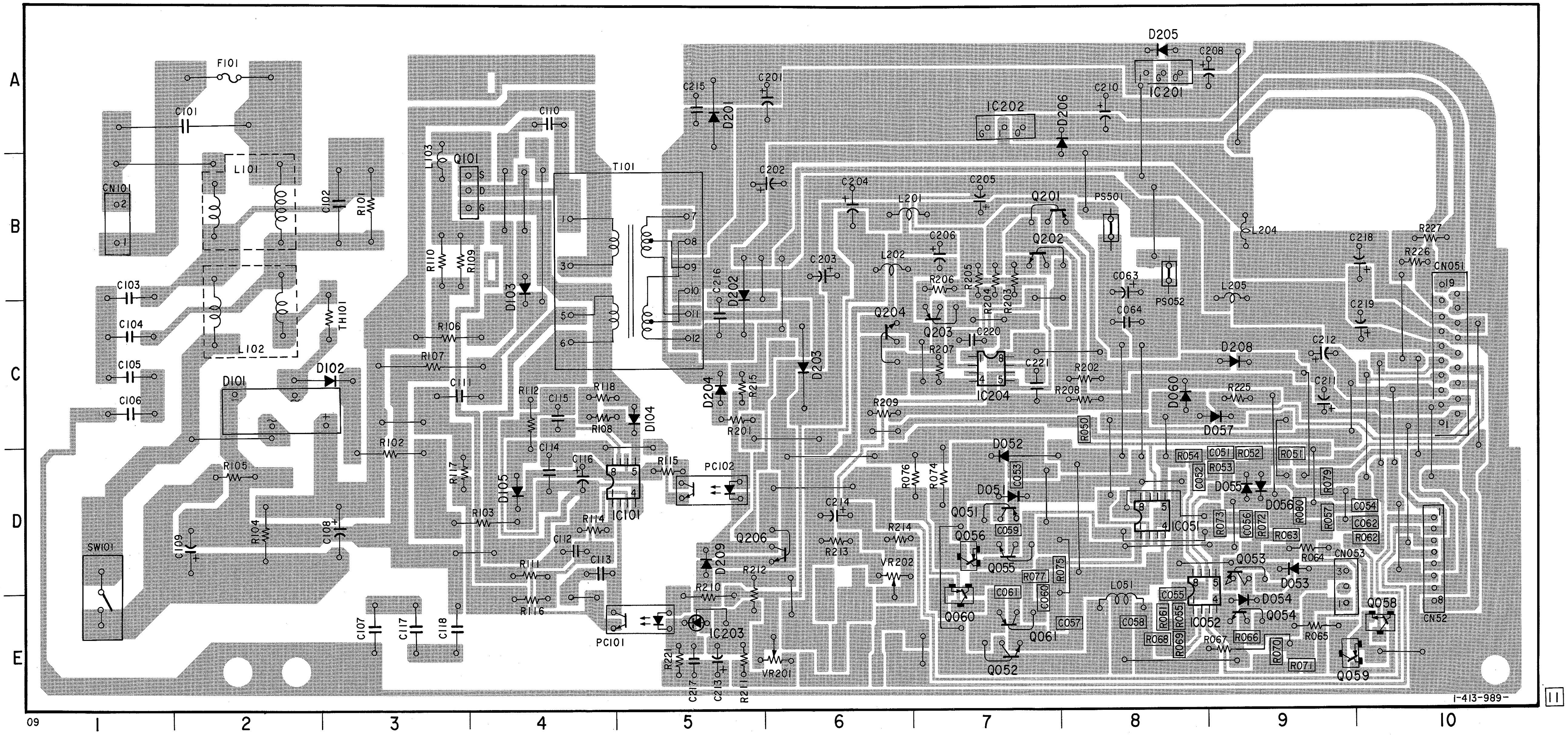
POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) PRINTED WIRING BOARD

— Ref. No. POWER BLOCK: 5000 series —

POWER BLOCK

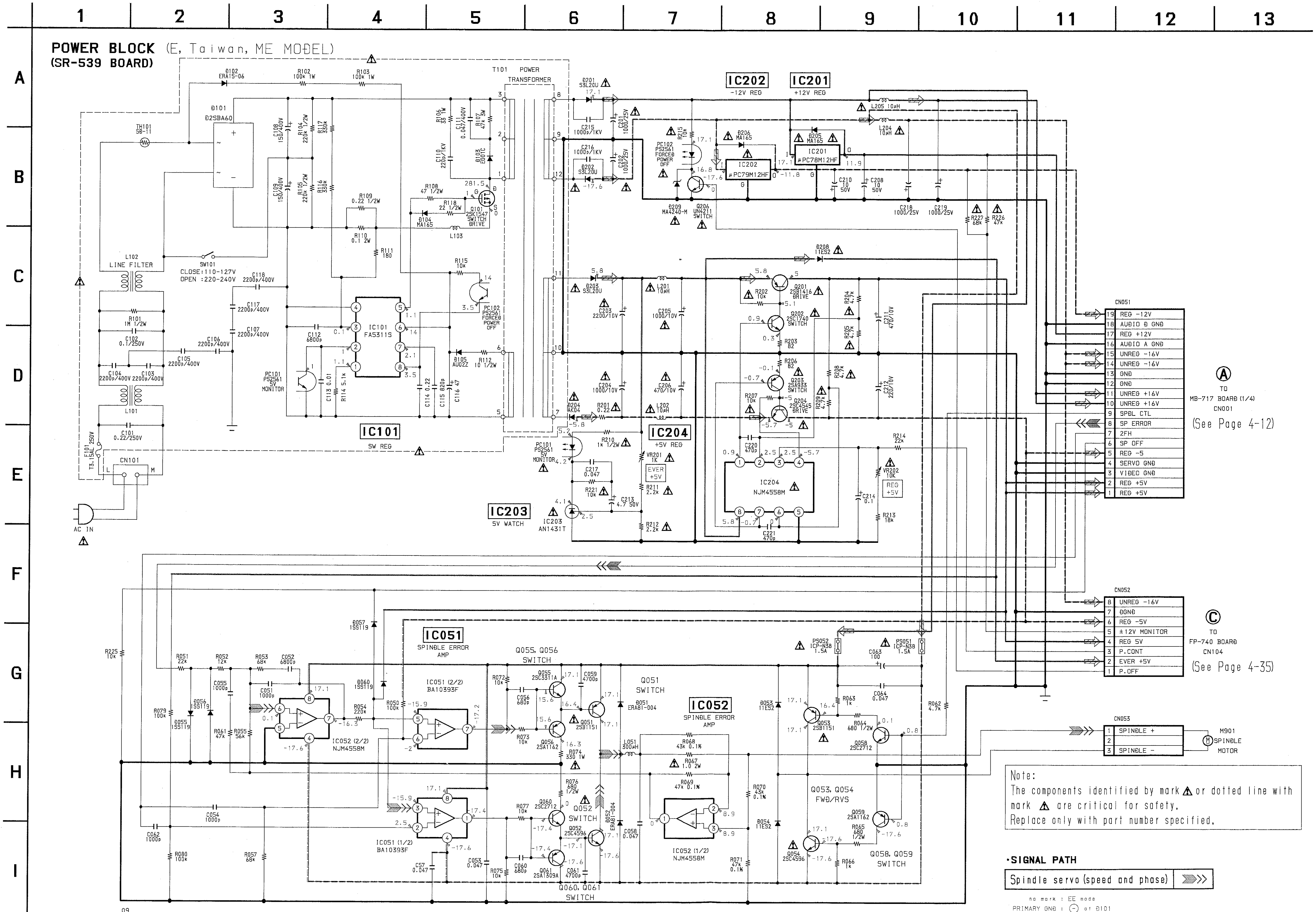
D051	D-7
D052	D-7
D053	D-9
D054	E-9
D055	D-9
D056	D-9
D057	C-9
D060	C-8
D101	C-2
D102	C-3
D103	C-4
D104	C-4
D105	D-4
D201	A-5
D202	C-5
D203	C-6
D204	C-5
D205	A-8
D206	B-7
D208	C-9
D209	D-5
IC051	D-8
IC052	E-8
IC101	D-5
IC201	A-8
IC202	B-7
IC203	E-5
IC204	C-7
Q051	D-7
Q052	E-7
Q053	D-9
Q054	E-9
Q055	D-7
Q056	D-7
Q058	E-10
Q059	E-9
Q060	E-7
Q061	E-7
Q101	B-4
Q201	B-7
Q202	B-7
Q203	C-7
Q204	C-6
Q206	D-6

POWER BLOCK (E, Taiwan, ME MODEL) (SR-539 BOARD)


A
B
C
D
E
09
1
2
3
4
5
6
7
8
9
10
F101
C101
CN101
L101
C102
R101
L103
Q101
C110
T101
C103
C104
C105
C106
L102
TH101
D101
D102
R110
R109
D103
R106
R107
C111
R112
C115
R118
R108
D104
R102
R105
R117
C114
C116
IC101
R115
PC102
D105
R103
R104
C108
C109
SW101
R114
C112
C113
R111
R116
C107
C117
C118
PC101
C215
D201
C201
C202
C216
D202
D204
R215
R201
D203
C203
C204
L201
L202
C205
C206
Q201
Q202
Q203
Q204
R205
R206
R204
R203
R207
C220
C221
IC204
R209
IC202
D206
C210
D205
C208
IC201
PS501
PS052
L204
C063
C064
L205
R202
R208
D060
D208
R225
D057
C212
C211
C218
C219
R227
R226
CN051
R050
D052
R076
R074
D051
Q051
C053
C052
Q056
C059
Q055
Q060
C061
R077
C060
R075
Q061
C057
Q052
C214
R214
R213
Q206
D209
R210
R212
VR202
IC203
R221
C217
C213
R211
VR201
R054
C051
R052
R053
R051
D055
D056
R079
R080
R057
IC051
R073
C056
R072
R063
C054
C062
R062
Q053
R064
CN053
D053
L051
C055
C058
R068
R061
R069
R065
IC052
D054
Q054
R067
R066
R070
R071
Q058
Q059
CN52
1-413-989-
11

POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) SCHEMATIC DIAGRAM

— Ref. No. POWER BLOCK: 5000 series —


POWER BLOCK (E, Taiwan, ME MODEL)
(SR-539 BOARD)
T101 POWER TRANSFORMER
IC202 -12V REG
IC201 +12V REG
IC202 PC79M12HF
IC201 PC78M12HF
IC101 SW REG
IC101 FA5311S
IC204 +5V REG
IC204 NJM4558M
IC203 5V WATCH
IC203 AN1431T
IC051 SPINDLE ERROR AMP
IC051 (2/2) BA10393F
IC051 (1/2) BA10393F
IC052 SPINDLE ERROR AMP
IC052 (2/2) NJM4558M
IC052 (1/2) NJM4558M
Q055, Q056 SWITCH
Q051 SWITCH
Q052 SWITCH
Q060, Q061 SWITCH
Q053, Q054 FWD/RVS
Q058, Q059 SWITCH
Q101 2SK1547 SWITCH DRIVE
Q201 2SB1416 DRIVE
Q202 2SC1740 SWITCH
Q203 2SA933 SWITCH
Q204 2SC4545 DRIVE
Q206 UN4211 SWITCH
PC101 PS2561 MONITOR
PC102 PS2561 FORCED POWER OFF
D101 D2SBA60
L102 LINE FILTER
SW101 CLOSE:110-127V OPEN :220-240V
F101 T3.15A 250V
CN101
AC IN
TH101 SB-11
L205 10µH
L204 10µH
L201 10µH
L202 10µH
L051 300µH
PS051 ICP-N38 1.5A
PS052 ICP-N38 1.5A
CN051
19 REG -12V
18 AUDIO D GND
17 REG +12V
16 AUDIO A GND
15 UNREG -16V
14 UNREG -16V
13 GND
12 GND
11 UNREG +16V
10 UNREG +16V
9 SPDL CTL
8 SP ERROR
7 2FH
6 SP OFF
5 REG -5
4 SERVO GND
3 VIDEO GND
2 REG +5V
1 REG +5V
Ⓐ TO MB-717 BOARD (1/4) CN001
(See Page 4-12)
CN052
8 UNREG -16V
7 DGND
6 REG -5V
5 ±12V MONITOR
4 REG 5V
3 P.CONT
2 EVER +5V
1 P.OFF
Ⓒ TO FP-740 BOARD CN104
(See Page 4-35)
CN053
1 SPINDLE +
2
3 SPINDLE -
M901 SPINDLE MOTOR
09

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

·SIGNAL PATH

Spindle servo (speed and phase)	⋙

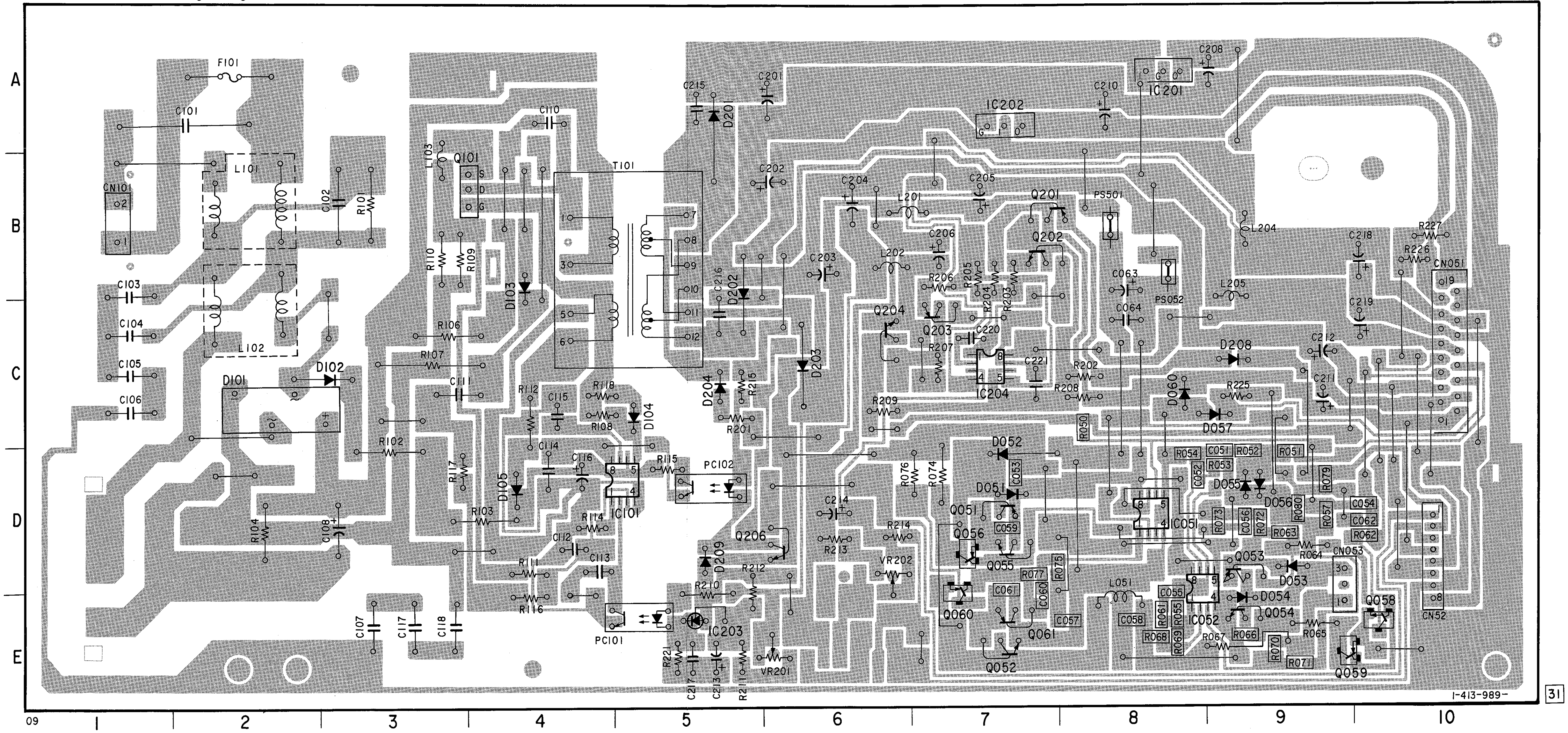
no mark : EE mode
PRIMARY GND : ⊖ of D101
SECONDARY GND : Pin ⑫ of CN051

POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) PRINTED WIRING BOARD

— Ref. No. POWER BLOCK: 5000 series —

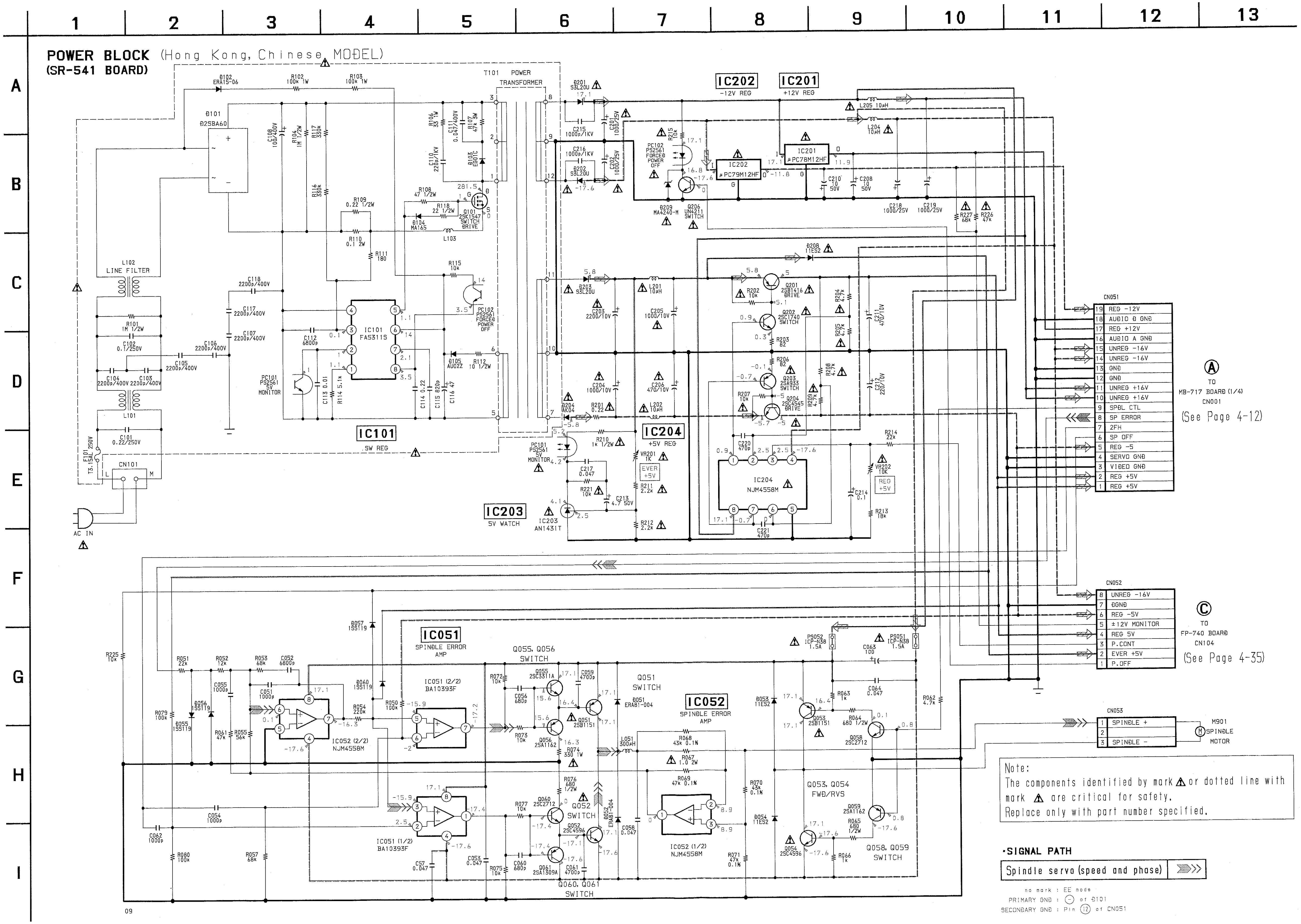
POWER BLOCK	
D051	D-7
D052	D-7
D053	D-9
D054	E-9
D055	D-9
D056	D-9
D057	C-9
D060	C-8
D101	C-2
D102	C-3
D103	C-4
D104	C-4
D105	D-4
D201	A-5
D202	C-5
D203	C-6
D204	C-5
D208	C-9
D209	D-5
IC051	D-8
IC052	E-8
IC101	D-5
IC201	A-8
IC202	B-7
IC203	E-5
IC204	C-7
Q051	D-7
Q052	E-7
Q053	D-9
Q054	E-9
Q055	D-7
Q056	D-7
Q058	E-10
Q059	E-9
Q060	E-7
Q061	E-7
Q101	B-4
Q201	B-7
Q202	B-7
Q203	C-7
Q204	C-6
Q206	D-6

POWER BLOCK (Hong Kong, Chinese MODEL) (SR-541 BOARD)


A
B
C
D
E
09
1
2
3
4
5
6
7
8
9
10
F101
C101
L101
L102
CN101
C102
R101
C103
C104
C105
C106
D101
D102
R104
C108
C107
C117
C118
Q101
L103
C110
T101
R110
R109
D103
R106
R107
C111
R102
R117
R103
R112
C115
R118
R108
D104
C114
C116
D105
IC101
R114
C112
C113
R111
R116
R115
PC102
PC101
C215
D201
C201
C202
C216
D202
D204
R216
R201
D203
D209
R212
R210
IC203
R221
C217
C213
R2110
VR201
Q206
C214
R213
R214
VR202
C204
L201
C203
L202
C205
C206
R206
R205
R204
R203
Q204
Q203
R207
C220
C221
IC204
R209
R202
R208
IC202
Q201
Q202
PS501
C063
C064
PS052
C210
C208
IC201
L204
L205
C218
C219
R227
R226
CN051
C212
C211
D208
R225
D060
D057
R050
D052
C053
R076
R074
D051
Q051
C059
Q056
Q055
Q060
C061
R077
R075
C060
C057
Q061
Q052
L051
IC051
R054
C051
R052
R053
C052
R051
R079
D055
D056
R073
C056
R072
R080
R063
R057
C054
C062
R062
R064
CN053
Q053
D053
C055
R061
R055
IC052
D054
Q054
C058
R068
R069
R067
R066
R065
R070
R071
Q058
Q059
CN52
1-413-989-
31

POWER BLOCK (POWER SUPPLY, MOTOR DRIVE) SCHEMATIC DIAGRAM

— Ref. No. POWER BLOCK: 5000 series —


1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
POWER BLOCK (Hong Kong, Chinese MODEL)
(SR-541 BOARD)
T101 POWER TRANSFORMER
D101 D2SBA60
D102 ERA15-06
R102 100k 1W
R103 100k 1W
L102 LINE FILTER
L101
F101 T3.15A 250V
CN101
AC IN
IC101 FA5311S
SW REG
Q101 2SC1547 SWITCH DRIVE
PC101 PS2561 5V MONITOR
PC102 PS2561 FORCED POWER OFF
D201 S3L20U
D202 S3L20U
D203 S3L20U
D204 AK04
IC202 -12V REG
IC201 +12V REG
IC202 μPC79M12HF
IC201 μPC78M12HF
IC203 5V WATCH
IC203 AN1431T
IC204 +5V REG
IC204 NJM4558M
Q201 2SB1416 DRIVE
Q202 2SC1740 SWITCH
Q203 2SA933 SWITCH
Q204 2SC4545 DRIVE
Q206 UN4211 SWITCH
D209 MA4240-M
D208 1ES2
L205 10μH
L204 10μH
L201 10μH
L202 10μH
VR201 1k
VR202 10k
EVER +5V
REG +5V
CN051
19 REG -12V
18 AUDIO D GND
17 REG +12V
16 AUDIO A GND
15 UNREG -16V
14 UNREG -16V
13 GND
12 GND
11 UNREG +16V
10 UNREG +16V
9 SPDL CTL
8 SP ERROR
7 2FH
6 SP OFF
5 REG -5
4 SERVO GND
3 VIDEO GND
2 REG +5V
1 REG +5V
Ⓐ TO MB-717 BOARD (1/4) CN001
(See Page 4-12)
CN052
8 UNREG -16V
7 DGND
6 REG -5V
5 ±12V MONITOR
4 REG 5V
3 P.CONT
2 EVER +5V
1 P.OFF
Ⓒ TO FP-740 BOARD CN104
(See Page 4-35)
PS052 ICP-N38 1.5A
PS051 ICP-N38 1.5A
CN053
1 SPINDLE +
2
3 SPINDLE -
M901 SPINDLE MOTOR
IC051 SPINDLE ERROR AMP
IC051 (2/2) BA10393F
IC051 (1/2) BA10393F
IC052 (2/2) NJM4558M
IC052 (1/2) NJM4558M
IC052 SPINDLE ERROR AMP
Q055, Q056 SWITCH
Q055 2SC3311A
Q056 2SA1162
Q051 SWITCH
Q051 2SB1151
Q052 SWITCH
Q052 2SC4596
Q060 2SC2712
Q061 2SA1309A
Q060, Q061 SWITCH
Q053, Q054 FWD/RVS
Q053 2SB1151
Q054 2SC4596
Q058 2SC2712
Q059 2SA1162
Q058, Q059 SWITCH
D051 ERA81-004
D052 ERA81-004
D053 1ES2
D054 1ES2
D055 1SS119
D056 1SS119
D057 1SS119
D060 1SS119
L051 300μH
09

Note:
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

·SIGNAL PATH

Spindle servo (speed and phase)	⋙

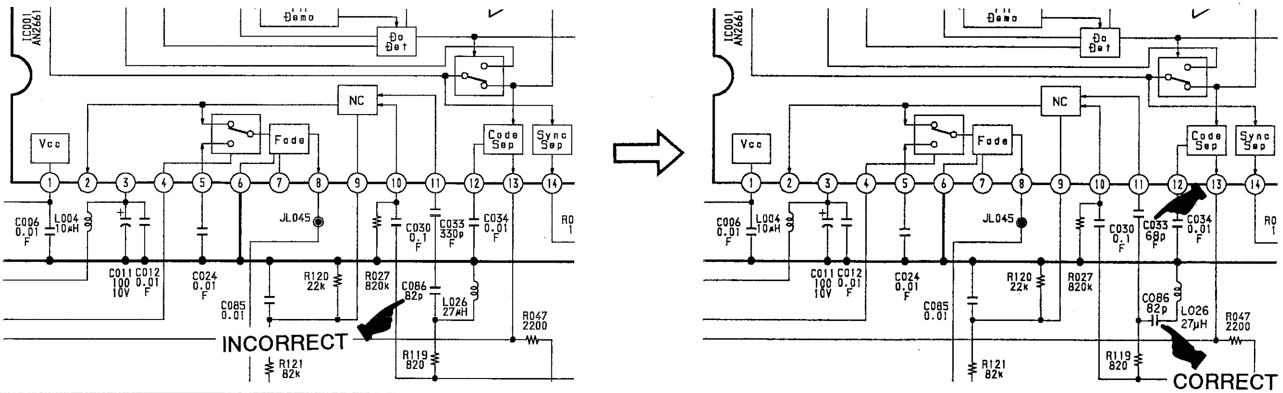
no mark : EE mode
PRIMARY GND : ⊖ of D101
SECONDARY GND : Pin ⑫ of CN051

• PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

☛ : indicates changed portion

MB-717 BOARD (1/4) (Page 4–13)

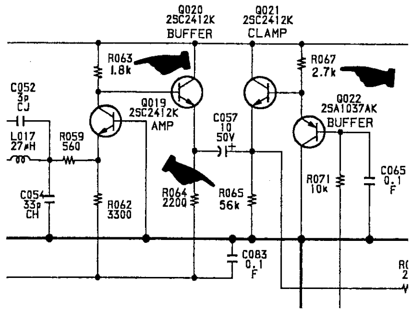
Location: F-10



IC001 AN2661
Demo
Do Det
NC
Vcc
Fade
Code Sep
Sync Sep
C006 0.01 F
L004 10μH
C011 100 10V
C012 0.01 F
C024 0.01 F
C085 0.01
JL045
R120 22k
R027 820k
C030 0.1 F
C033 330p F
C034 0.01 F
C086 82p
L026 27μH
R047 2200
R119 820
R121 82k
INCORRECT
C033 68p
CORRECT

MB-717 BOARD (1/4) (Page 4–13)

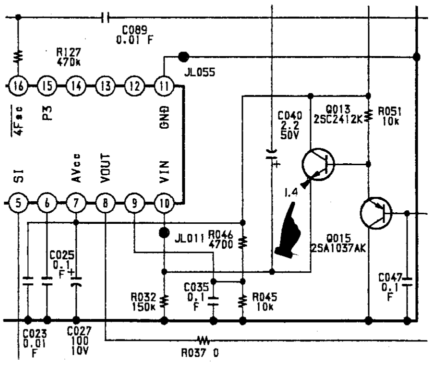
Location: A-13



Q020 2SC2412K BUFFER
Q021 2SC2412K CLAMP
R063 1.8k
R067 2.7k
C052 3p CJ
Q019 2SC2412K AMP
Q022 2SA1037AK BUFFER
L017 27μH
R059 560
C057 10 50V
C054 33p CH
R062 3300
R064 2200
R065 56k
R071 10k
C065 0.1 F
C083 0.1 F

MB-717 BOARD (1/4) (Page 4–13)

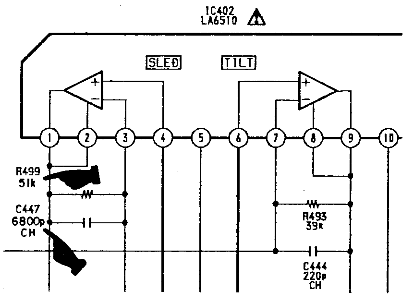
Location: J-10



C089 0.01 F
R127 470k
JL055
4Fsc
P3
GND
SI
AVcc
VOUT
VIN
C040 2.2 50V
Q013 2SC2412K
R051 10k
1.4
JL011
R046 4700
Q015 2SA1037AK
C025 0.1 F
C035 0.1 F
R032 150k
R045 10k
C047 0.1 F
C023 0.01 F
C027 100 10V
R037 0

MB-717 BOARD (2/4) (Page 4–16)

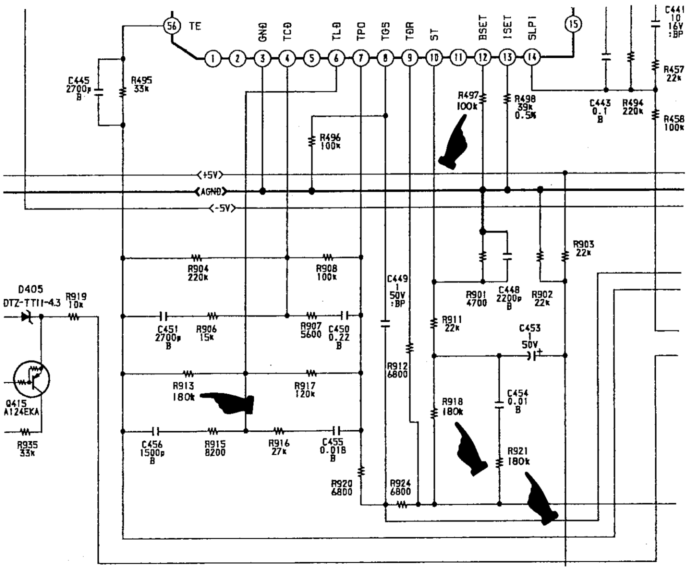
Location: H-12



IC402 LA6510 ⚠
SLED
TILT
R499 51k
C447 6800p CH
R493 39k
C444 220p CH

MB-717 BOARD (2/4) (Page 4–15)

Location: J-3



TE
GND
TCG
TLG
TPG
TGS
TGR
ST
BSET
ISET
SLPI
C441 10 16V :BP
C445 2700p B
R495 33k
R497 100k
R498 39k 0.5%
C443 0.1 B
R494 220k
R457 22k
R458 100k
R496 100k
+5V
AGND
-5V
R904 220k
R908 100k
C449 1 50V :BP
R903 22k
R901 4700
C448 2200p B
R902 22k
D405 DTZ-TT11-4.3
R919 10k
C451 2700p B
R906 15k
R907 5600
C450 0.22 B
R911 22k
C453 1 50V
Q415 A124EKA
R913 180k
R917 120k
R912 6800
R918 180k
C454 0.01 B
R935 33k
C456 1500p B
R915 8200
R916 27k
C455 0.018 B
R921 180k
R920 6800
R924 6800

Only the following parts are different for the MB-717 board

Ref. No.	Former					New				
	Part No.	Description				Part No.	Description			
C033	1-163-129-00	CERAMIC CHIP	330PF	5%	50V	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C447	1-163-249-11	CERAMIC CHIP	82PF	5%	50V	1-163-019-00	CERAMIC CHIP	0.0068uF	10%	50V
IC501	8-759-293-56	IC	MB89094PF-G-131-BND			8-759-336-04	IC	MB89094PF-G-135-BND		
R063	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R065	1-216-097-00	METAL CHIP	100K	5%	1/10W	1-216-091-00	METAL CHIP	56K	5%	1/10W
R067	1-216-073-00	METAL CHIP	10K	5%	1/10W	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R497	1-216-085-00	METAL CHIP	33K	5%	1/10W	1-216-097-00	METAL CHIP	100K	5%	1/10W
R499	1-216-093-00	METAL CHIP	68K	5%	1/10W	1-216-090-00	METAL CHIP	51K	5%	1/10W
R913	1-216-109-00	METAL CHIP	330K	5%	1/10W	1-216-103-91	METAL CHIP	180K	5%	1/10W
R918	1-216-099-00	METAL CHIP	120K	5%	1/10W	1-216-103-91	METAL CHIP	180K	5%	1/10W
R921	1-216-099-00	METAL CHIP	120K	5%	1/10W	1-216-103-91	METAL CHIP	180K	5%	1/10W

SECTION 5
REPAIR PARTS LIST

5-1. EXPLODED VIEWS

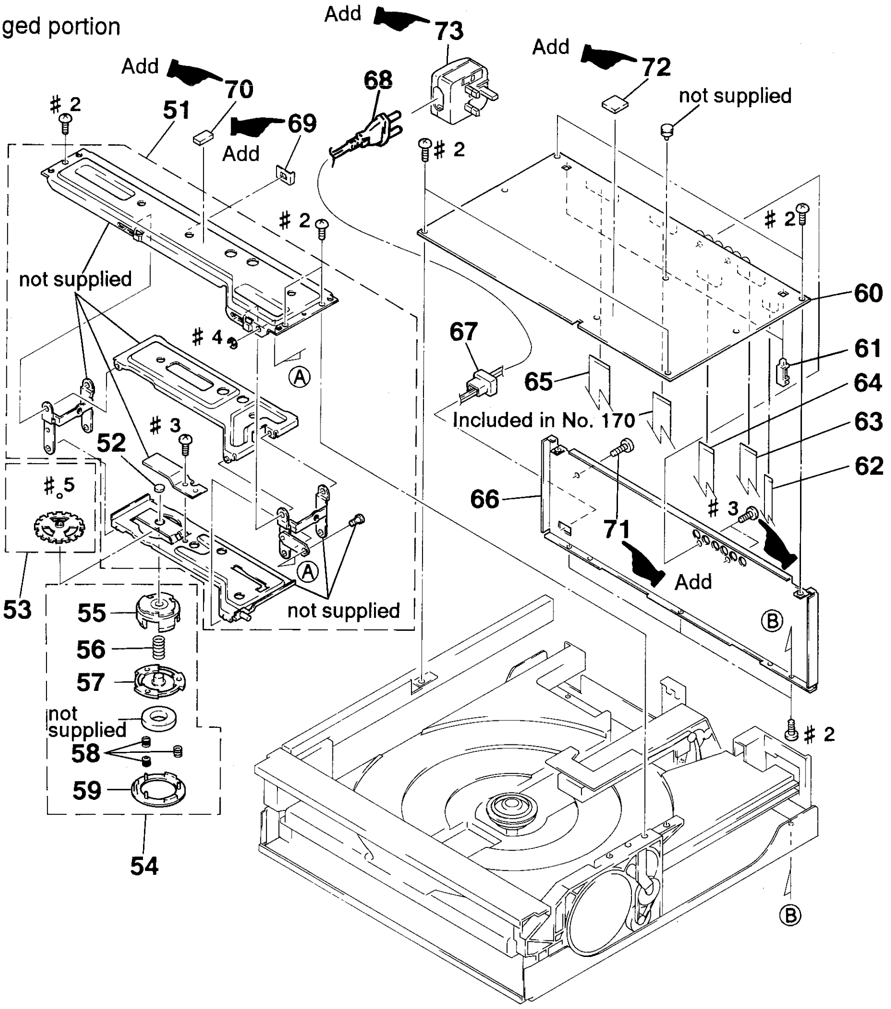
NOTE:

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked " * " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.
- Abbreviation
  HK : Hong Kong model
  TW : Taiwan model

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

5-1-2. CHUCKING BLOCK ASSEMBLY

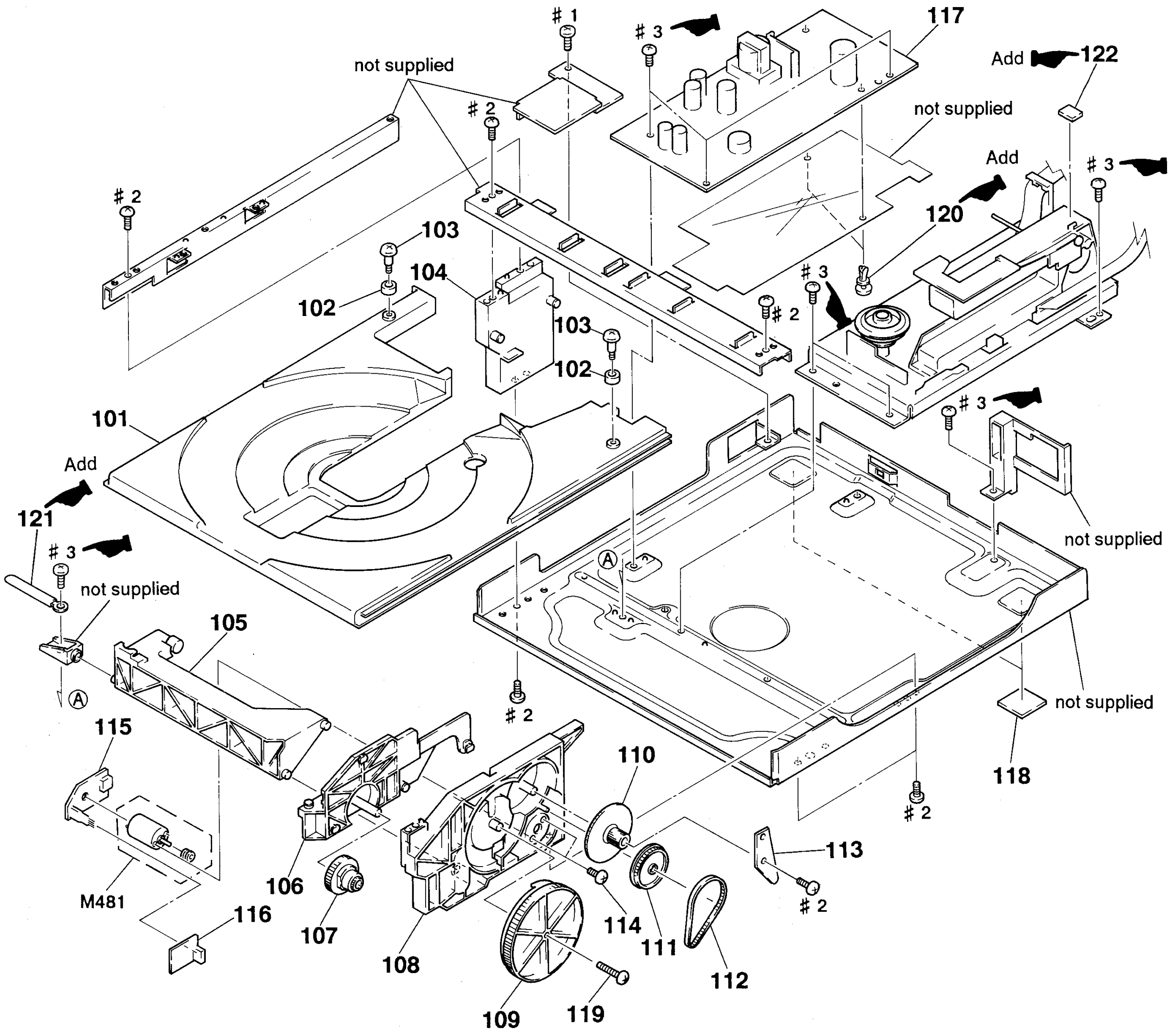
☛ : Indicates changed portion



Ref. No.	Part No.	Description	Remark
* 51	A-6415-863-A	CHUCKING, SUB BLOCK ASSY	
52	3-953-392-01	RETAINER, THRUST	
53	X-3942-787-1	PLATE ASSY, TOP	
54	A-6415-644-G	CHUCK BLOCK ASSY	
55	X-3942-776-1	HOLDER ASSY, MAGNET	
56	3-953-291-01	SPRING (1), COMPRESSION	
57	3-953-288-01	PLATE, CHUCKING	
58	3-953-290-01	SPRING (2), COMPRESSION	
59	X-3943-043-1	GUIDE (B) ASSY, CENTER	
* 60	A-6423-233-A	MB-717 BOARD, COMPLETE (EXCEPT TW)	
* 60	A-6423-270-A	MB-717 BOARD, COMPLETE (TW)	
* 61	3-961-116-01	GUIDE, MB	
62	1-769-148-11	FLAT CABLE (FMM-001)(7 CORE)	
63	1-769-149-11	FLAT CABLE (FUF-002)(11 CORE)	
64	1-769-147-11	FLAT CABLE (FMD-003)(12 CORE)	
65	1-769-146-11	FLAT CABLE (FMP-002)(19 CORE)	
* 66	3-961-079-01	PANEL, REAR (EXCEPT TW)	
* 66	3-961-079-21	PANEL, REAR (TW)	
⚠*67	3-703-244-00	BUSHING (2104), CORD (EXCEPT TW)	
⚠*67	3-703-571-11	BUSHING (4516), CORD (TW)	
⚠68	1-575-912-21	CORD, POWER (EXCEPT TW)	
⚠*68	1-751-555-11	CORD, POWER (TW) ☛	
⚠*69	3-962-802-01	HOLDER, STOPPER ☛	
70	9-911-840-XX	CUSHION (U) ☛	
71	3-710-901-11	SCREW, TAPPING ☛	
72	3-728-465-01	CUSHION, OPT ☛	
73	1-770-019-11	ADAPTOR, CONVERSION 3P (HK) ☛	

5-1-3. MAIN CHASSIS ASSEMBLY

☛ : Indicates changed portion



# 1
# 3 ☛
117
not supplied
Add ☛ 122
# 2
not supplied
Add
# 3 ☛
120 ☛
# 2
103
104
102
103
102
# 3
# 2
# 3 ☛
101
Add
121 ☛
# 3 ☛
not supplied
not supplied
105
Ⓐ
Ⓐ
not supplied
115
# 2
110
118
# 2
113
# 2
106
M481
116
107
114
111
108
112
109
119

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
101	A-6415-859-A	TRAY (90E) ASSY	
* 102	4-914-248-01	STOPPER, RUBBER	
103	3-963-090-01	SCREW, TRAY STOPPER	
* 104	X-3944-523-1	STAY (L) ASSY, F	
* 105	X-3944-520-1	FRAME ASSY, TRAY UD	
106	X-3944-514-1	BASE ASSY, L SUB	
107	3-961-085-01	GEAR, IDLER	
108	X-3944-513-1	BASE ASSY, LOADING	
109	3-961-083-01	GEAR, CONTROL	
110	3-961-081-01	GEAR, MIDDLE	
111	3-961-084-01	PULLEY (A)	
112	3-961-082-01	BELT, TIMING	
* 113	3-962-050-01	STAY, REINFORCEMENT	
114	3-962-049-01	SCREW, MOTOR STOPPER	
* 115	1-654-464-11	MT-707 BOARD	
* 116	A-6423-236-A	SW-732 BOARD, COMPLETE	
⚠117	1-413-989-11	POWER BLOCK (E, TW, ME) ☛	CORRECT
⚠117	1-413-989-31	POWER BLOCK (HK, Chinese) ☛	CORRECT
118	3-961-110-01	CUSHION, FOOT	
119	3-962-812-01	SCREW +BVTP 3X18 TYPE 2	
120	3-531-576-21	RIVET ☛	
* 121	3-703-150-11	CLAMP ☛	
122	9-911-841-XX	CUSHION, RUBBER ☛	
M481	X-3944-685-1	MOTOR ASSY, LOADING (RF-370C)	

5-2. ELECTRICAL PARTS LIST

NOTE:

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board name.

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- RESISTORS
  All resistors are in ohms
  METAL: Metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F : nonflammable
- SEMICONDUCTORS
  In each case, u: μ, for example:
  uA...: μA..., uPA...: μPA..., uPB...: μPB..., uPC...: μPC..., uPD...: μPD...
- CAPACITORS
  uF : μF
- COILS
  uH : μH
- Abbreviation
  HK : Hong Kong model
  TW : Taiwan model

Ref. No.	Part No.	Description	Remark
⚠	1-413-989-11	POWER BLOCK (Ref. No. 5,000 Series) ***********	
⚠	1-533-223-11	HOLDER, FUSE	
		< CAPACITOR >	
C051	1-163-009-11	MULTILAYER CERAMIC 1000PF 10% 50V	
C052	1-163-019-00	MULTILAYER CERAMIC 6800PF 10% 50V	
C053	1-163-035-00	MULTILAYER CERAMIC 0.047uF 50V	
C054	1-163-009-11	MULTILAYER CERAMIC 1000PF 10% 50V	
C055	1-163-009-11	MULTILAYER CERAMIC 1000PF 10% 50V	
C056	1-163-007-11	MULTILAYER CERAMIC 680PF 10% 50V	
C057	1-163-035-00	MULTILAYER CERAMIC 0.047uF 50V	
C058	1-163-035-00	MULTILAYER CERAMIC 0.047uF 50V	
C059	1-163-017-00	MULTILAYER CERAMIC 4700PF 10% 50V	
C060	1-163-007-11	MULTILAYER CERAMIC 680PF 50V	
C061	1-163-017-00	MULTILAYER CERAMIC 4700PF 10% 50V	
C062	1-163-009-11	MULTILAYER CERAMIC 1000PF 10% 50V	
C063	1-124-122-11	ALUMINUM ELECTRIC 100uF 20% 50V	
C064	1-130-491-00	FILM 0.047uF 5% 50V	
⚠C101	9-902-038-01	METALLIZED 0.22uF 250V	
⚠C102	9-900-521-01	METALLIZED 0.1uF 250V	
⚠C103	1-161-742-00	CERAMIC 2200PF 400V	
⚠C104	1-161-742-00	CERAMIC 2200PF 400V	
⚠C105	1-161-742-00	CERAMIC 2200PF 400V	
⚠C106	1-161-742-00	CERAMIC 2200PF 400V	
⚠C107	1-161-742-00	CERAMIC 2200PF 400V	
⚠C108	9-909-672-01	ALUMINUM ELECTRIC 150uF 400V	(E, TW, ME)
⚠C108	9-933-733-01	ALUMINUM ELECTRIC 100uF 400V	(HK, Chinese)
⚠C109	9-909-672-01	ALUMINUM ELECTRIC 150uF 400V	(E, TW, ME)
⚠C110	9-909-673-01	CERAMIC 220PF 1000V	
⚠C111	9-900-525-01	METALLIZED 0.047uF 400V	
⚠C112	1-106-363-00	FILM 0.0068uF 5% 200V	
⚠C113	1-130-483-00	METALLIZED 0.01uF 5% 50V	
⚠C114	1-107-355-51	METALLIZED 0.22uF 5% 200V	
⚠C115	1-130-470-00	FILM 820PF 5% 50V	
⚠C116	1-126-967-11	ALUMINUM ELECTRIC 47uF 20% 50V	
⚠C117	1-161-742-00	CERAMIC 2200PF 400V	
⚠C118	1-161-742-00	CERAMIC 2200PF 400V	
⚠C201	1-124-525-11	ALUMINUM ELECTRIC 1000uF 20% 25V	
⚠C202	1-124-525-11	ALUMINUM ELECTRIC 1000uF 20% 25V	
⚠C203	1-124-760-11	ALUMINUM ELECTRIC 2200uF 20% 10V	
⚠C204	1-126-926-11	ALUMINUM ELECTRIC 1000uF 20% 10V	
⚠C205	1-126-926-11	ALUMINUM ELECTRIC 1000uF 20% 10V	
⚠C206	1-126-925-11	ALUMINUM ELECTRIC 470uF 20% 10V	
C208	1-126-964-51	ALUMINUM ELECTRIC 10uF 20% 50V	
C210	1-126-964-51	ALUMINUM ELECTRIC 10uF 20% 50V	
C211	1-126-925-11	ALUMINUM ELECTRIC 470uF 20% 10V	
C212	1-126-923-11	ALUMINUM ELECTRIC 220uF 20% 10V	
C213	1-130-495-91	ALUMINUM ELECTRIC 4.7uF 5% 50V	
C214	1-124-463-11	ALUMINUM ELECTRIC 0.1uF 50V	
C215	9-909-680-01	CERAMIC 1000PF 1000V	
C216	9-909-680-01	CERAMIC 1000PF 1000V	
C217	1-130-491-00	FILM 0.047uF 5% 50V	
C218	1-126-942-61	ALUMINUM ELECTRIC 1000uF 20% 25V	
C219	1-126-942-61	ALUMINUM ELECTRIC 1000uF 20% 25V	
C220	1-130-467-00	FILM 470PF 5% 50V	
C221	1-130-467-00	FILM 470PF 5% 50V	
		< CONNECTOR >	
CN051	1-695-342-31	CONNECTOR 19P	
* CN052	1-506-473-11	CONNECTOR 8P	
CN053	1-564-506-11	CONNECTOR 3P	
* CN101	1-564-419-11	HEADER, SPRING (POWER) 2P	
		< DIODE >	
D051	9-902-064-01	DIODE ERA81-004	
D052	9-902-064-01	DIODE ERA81-004	
D053	8-719-200-82	DIODE 11ES2	
D054	8-719-200-82	DIODE 11ES2	
D055	8-719-911-19	DIODE 1SS119-25	
D056	8-719-911-19	DIODE 1SS119-25	
D057	8-719-911-19	DIODE 1SS119-25	
D060	8-719-911-19	DIODE 1SS119-25	
⚠D101	8-719-510-19	BRIDGE DIODE D2SBA60	
⚠D102	9-902-050-01	DIODE ERA15-06	
⚠D103	8-719-030-25	DIODE EG01CV0	
⚠D104	9-900-514-01	DIODE MA165	
⚠D105	9-900-535-01	DIODE AU02Z	
⚠D201	8-719-510-72	DIODE S3L20UF1	
⚠D202	8-719-510-72	DIODE S3L20UF1	

POWER BLOCK

Ref.No.	Part No.	Description	Remark
⚠D203	8-719-510-72	DIODE S3L20UF1	
⚠D204	8-719-043-74	DIODE AK04	
⚠D205	9-900-514-01	DIODE MA165 (E,TW,ME)	
⚠D206	9-900-514-01	DIODE MA165 (E,TW,ME)	
⚠D208	8-719-200-82	DIODE 11ES2	
⚠D209	8-719-035-04	ZENNER DIODE MA4240	

< FUSE >

Ref.No.	Part No.	Description	Remark
⚠F101	1-532-286-00	FUSE TIME LUG (T3.15AL 250V)	

< IC >

Ref.No.	Part No.	Description	Remark
IC051	8-759-982-73	IC BA10393F	
IC052	8-759-100-96	IC uPC4558G2	
⚠IC101	8-759-062-58	IC FA5311S	
⚠IC201	8-759-701-79	IC NJM78M12FA	
⚠IC202	8-759-929-65	IC LM7912CT	
⚠IC203	9-900-532-01	IC AN1431T	
⚠IC204	8-759-100-96	IC uPC4558G2	

< COIL >

Ref.No.	Part No.	Description	Remark
L051	1-424-219-11	CHORKE COIL 300uH	
⚠L101	9-909-675-01	LINE FILTER	
⚠L102	9-909-675-01	LINE FILTER	
⚠L103	9-904-796-01	BEAD CORE	
⚠L201	9-909-681-01	CHORKE COIL 10uH	
⚠L202	9-909-681-01	CHORKE COIL 10uH	
⚠L204	9-909-681-01	CHORKE COIL 10uH	
⚠L205	9-909-681-01	CHORKE COIL 10uH	

< PHOTO COUPLER >

Ref.No.	Part No.	Description	Remark
⚠PC101	9-909-676-01	PHOTO COUPLER	
⚠PC102	9-909-677-01	PHOTO COUPLER	

< IC LINK >

Ref.No.	Part No.	Description	Remark
⚠PS051	1-532-675-00	IC LINK (ICP-N38 1.5A)	
⚠PS052	1-532-675-00	IC LINK (ICP-N38 1.5A)	

< TRANSISTOR >

Ref.No.	Part No.	Description	Remark
⚠Q051	8-729-117-11	TRANSISTOR 2SB1151-L	
⚠Q052	8-729-019-31	TRANSISTOR 2SC4596E	
⚠Q053	8-729-117-11	TRANSISTOR 2SB1151-L	
⚠Q054	8-729-019-31	TRANSISTOR 2SC4596E	
Q055	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q056	8-729-230-46	TRANSISTOR 2SA1162-YG	
Q058	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q059	8-729-230-46	TRANSISTOR 2SA1162-YG	
Q060	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q061	8-729-119-76	TRANSISTOR 2SA1175-HFE	
⚠Q101	9-909-669-01	TRANSISTOR 2SK1547	
⚠Q201	8-729-021-99	TRANSISTOR 2SB1416-R	
⚠Q202	8-729-119-78	TRANSISTOR 2SC2785-HFE	
⚠Q203	8-729-119-76	TRANSISTOR 2SA1175-HFE	
⚠Q204	9-909-678-01	TRANSISTOR 2SC4545	
⚠Q206	8-729-900-80	TRANSISTOR DTC114ES	

< RESISTOR >

Ref.No.	Part No.	Description				Remark
R050	1-216-097-00	THICK FILM	100K	5%	1/10W	
R051	1-216-081-00	THICK FILM	22K	5%	1/10W	
R052	1-216-075-00	THICK FILM	12K	5%	1/10W	
R053	1-216-093-11	THICK FILM	68K	5%	1/10W	
R054	1-216-105-00	THICK FILM	220K	5%	1/10W	
R055	1-216-091-00	THICK FILM	56K	5%	1/10W	
R057	1-216-093-11	THICK FILM	68K	5%	1/10W	
R061	1-216-089-00	THICK FILM	47K	5%	1/10W	
R062	1-216-065-00	THICK FILM	4.7K	5%	1/10W	
R063	1-216-049-11	THICK FILM	1K	5%	1/10W	
R064	1-247-750-11	CARBON	680	5%	1/2W	
R065	1-247-750-11	CARBON	680	5%	1/2W	
R066	1-216-049-11	THICK FILM	1K	5%	1/10W	
⚠R067	1-216-369-00	CARBON	1	5%	2W	
R068	1-219-387-11	THICK FILM	43K	0.1%	1/16W	
R069	1-219-391-11	THICK FILM	47K	0.1%	1/16W	
R070	1-219-387-11	THICK FILM	43K	0.1%	1/16W	
R071	1-219-391-11	THICK FILM	47K	0.1%	1/16W	
R072	1-216-073-00	THICK FILM	10K	5%	1/10W	
R073	1-216-073-00	THICK FILM	10K	5%	1/10W	
⚠R074	1-215-866-11	CARBON	330	5%	1W	
R075	1-216-073-00	THICK FILM	10K	5%	1/10W	
R076	1-247-750-11	CARBON	680	5%	1/2W	
R077	1-216-073-00	THICK FILM	10K	5%	1/10W	
R079	1-216-097-00	THICK FILM	100K	5%	1/10W	
R080	1-216-097-00	THICK FILM	100K	5%	1/10W	
⚠R101	9-900-394-01	NON-FLAMABLE CARBON	1M		1/2W	
⚠R102	1-218-642-11	METAL OXIDE FILM	100K	5%	1W	
⚠R103	1-218-642-11	METAL OXIDE FILM	100K	5%	1W	
⚠R104	1-214-921-00	CARBON	220K	1%	1/2W	(E,TW,ME)
⚠R104	1-260-135-11	CARBON	1M	5%	1/2W	(HK,Chinese)
⚠R105	1-214-921-00	CARBON	220K	1%	1/2W	(E,TW,ME)
⚠R106	1-215-860-11	METAL OXIDE FILM	33	5%	1W	
⚠R107	1-215-927-00	METAL OXIDE FILM	47K	5%	3W	
⚠R108	1-212-974-00	NON-FLAMABLE CARBON	47	5%	1/2W	
⚠R109	9-909-670-01	METAL FILM	0.22		1/2W	
⚠R110	9-909-671-01	CEMENT	0.1		2W	
⚠R111	1-249-408-11	CARBON	180	5%	1/4W	
⚠R112	1-212-958-00	NON-FLAMABLE CARBON	10	5%	1/2W	
⚠R114	1-247-848-11	CARBON	5.1K	5%	1/4W	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

☛ : Indicates changed portion

POWER BLOCK

Ref. No.	Part No.	Description			Remark
⚠R115	1-247-855-31	CARBON	10K	5%	1/4W
⚠R116	1-247-891-00	CARBON	330K	5%	1/4W
⚠R117	1-247-891-00	CARBON	330K	5%	1/4W
⚠R118	1-212-966-00	NON-FLAMABLE CARBON	22	5%	1/2W
⚠R201	9-909-679-01	FUSE	0.22		1/4W
⚠R202	1-247-855-31	CARBON	10K	5%	1/4W
R203	1-249-404-00	CARBON	82	5%	1/4W
⚠R204	1-247-847-11	CARBON	4.7K	5%	1/4W
⚠R205	1-247-847-11	CARBON	4.7K	5%	1/4W
R206	1-249-404-00	CARBON	82	5%	1/4W
⚠R207	1-247-855-31	CARBON	10K	5%	1/4W
⚠R208	1-247-847-11	CARBON	4.7K	5%	1/4W
⚠R209	1-247-847-11	CARBON	4.7K	5%	1/4W
⚠R210	1-260-099-11	CARBON	1K	5%	1/2W
⚠R211	1-247-839-31	CARBON	2.2K	5%	1/4W
⚠R212	1-247-839-31	CARBON	2.2K	5%	1/4W
R213	1-249-432-11	CARBON	18K	5%	1/4W
R214	1-249-433-11	CARBON	22K	5%	1/4W
⚠R215	1-247-855-31	CARBON	10K	5%	1/4W
⚠R221	1-247-855-31	CARBON	10K	5%	1/4W
R225	1-247-855-31	CARBON	10K	5%	1/4W
⚠R226	1-247-871-11	CARBON	47K	5%	1/4W
⚠R227	1-249-439-11	CARBON	68K	5%	1/4W
		< SWITCH >			
⚠SW101	1-572-675-11	POWER VOLTAGE CHANGE SWITCH (E, TW, ME)			
		< TRANSFORMER >			
⚠T101	9-909-674-01	SWITCHING TRANSFORMER			
		< THERMISTOR >			
⚠TH101	9-904-783-01	POWER THERMISTOR (E, TW, ME)			
		< TRIMMER >			
⚠VR201	1-223-236-11	CARBON TRIMMER POTENTIOMETER 1K			
⚠VR202	1-223-239-11	CARBON TRIMMER POTENTIOMETER 10K			

****

MISCELLANEOUS
****

Ref. No.	Part No.	Description
17	1-769-150-11	FLAT CABLE (FFP-001)(7 CORE)
62	1-769-148-11	FLAT CABLE (FMM-001)(7 CORE)
63	1-769-149-11	FLAT CABLE (FUF-002)(11 CORE)
64	1-769-147-11	FLAT CABLE (FMD-003)(12 CORE)
65	1-769-146-11	FLAT CABLE (FMP-002)(19 CORE)
⚠*68	1-769-500-11	CORD, POWER (TW)
⚠68	1-575-912-21	CORD, POWER (EXCEPT TW)
73	1-770-019-11	ADAPTER CONVERSION 3P (HK) ☛
⚠117	1-413-989-11	POWER BLOCK (E, TW, ME) ☛ CORRECT
⚠117	1-413-989-31	POWER BLOCK (HK, Chinese) ☛ CORRECT
⚠168	8-848-286-11	DEVICE, OPTICAL KHS-150A(S)
170	1-751-083-11	CABLE, FLEXIBLE FLAT (18 CORE)
172	1-769-151-11	FLAT CABLE (FMB-001)(4 CORE)
M421	1-541-930-11	MOTOR, DC (TILT)
M481	X-3944-685-1	MOTOR ASSY, LOADING (RF-370C)
M901	1-698-109-11	MOTOR, DD (SPINDLE)

****

ACCESSORIES & PACKING MATERIALS
****

Ref. No.	Part No.	Description
	1-569-008-11	ADAPTER, CONVERSION 2P(EXCEPT TW, HK) ☛
	1-575-334-11	CORD, CONNECTION (A/V connecting cable (Stereo) 1.5M)
	3-759-585-11	MANUAL, INSTRUCTION (ENGLISH, SPANISH, CHINESE)(EXCEPT TW)
	3-759-585-41	MANUAL, INSTRUCTION (CHINESE)(TW)
*	3-798-308-41	CARD, HANDLING EXPLANATION (HK) ☛
*	3-961-118-01	CUSHION (UPPER)
*	3-961-119-01	CUSHION (LOWER)
	A-6772-990-A	REMOTE CONTROL (RMT-M23A)(EXCEPT TW)
*	A-6778-030-A	REMOTE CONTROL (RMT-M23B)(TW)
*	X-3944-710-1	INDIVIDUAL CARTON ASSY (EXCEPT TW, HK)
*	X-3944-905-1	INDIVIDUAL CARTON ASSY (TW) ☛
*	X-3945-044-1	INDIVIDUAL CARTON ASSY (HK) ☛

****

****
HARDWARE LIST
****

Ref. No.	Part No.	Description
#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 IT-3
#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 IT-3
#3	7-685-645-79	SCREW +BVTP 3X6 TYPE2 IT-3
#4	7-624-105-04	STOP RING 2.3, TYPE -E
#5	7-671-155-01	STEEL BALL 3.0
#6	7-685-133-19	+PTP 2.6X6
#7	7-685-103-19	SCREW +P 2X5 TYPE2 SLIT
#8	7-621-759-65	+PSW, 2.6X8
#9	7-628-253-05	SCREW +PS 2X4
#10	7-682-946-09	SCREW +PSW 3X5
#11	7-623-212-22	SW 5, TYPE 2 ☛
#12	7-624-190-81	STOP RING 2, TYPE-CS
#13	7-621-759-35	+PSW, 2.6X5
#14	7-684-220-02	NUT 3, HEXAGON CAP

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

English
95C0914-1
Printed in Japan
© 1995. 3

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

Published by Personal A&V Products Div.
Quality Engineering Dept.

9-973-634-81

9-973-634-12
(with
9-973-634-81)

Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

English
95G0901-2(3)
Printed in Japan
© 1994. 10
Published by Home A&V Products Div.
Quality Engineering Dept.